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OF THE
AMERICAN STATISTICAL ASSOCIATION

MARCH, 1932
Supplement

PAPERS AND PROCEEDINGS

OF THE

NINETY-THIRD ANNUAL MEETING

OF THE

AMERICAN STATISTICAL ASSOCIATION

Edited by
HARRY C. CARVER

Held at Washington, D. C.
December 28-30,
Nineteen Hundred and Thirty-One

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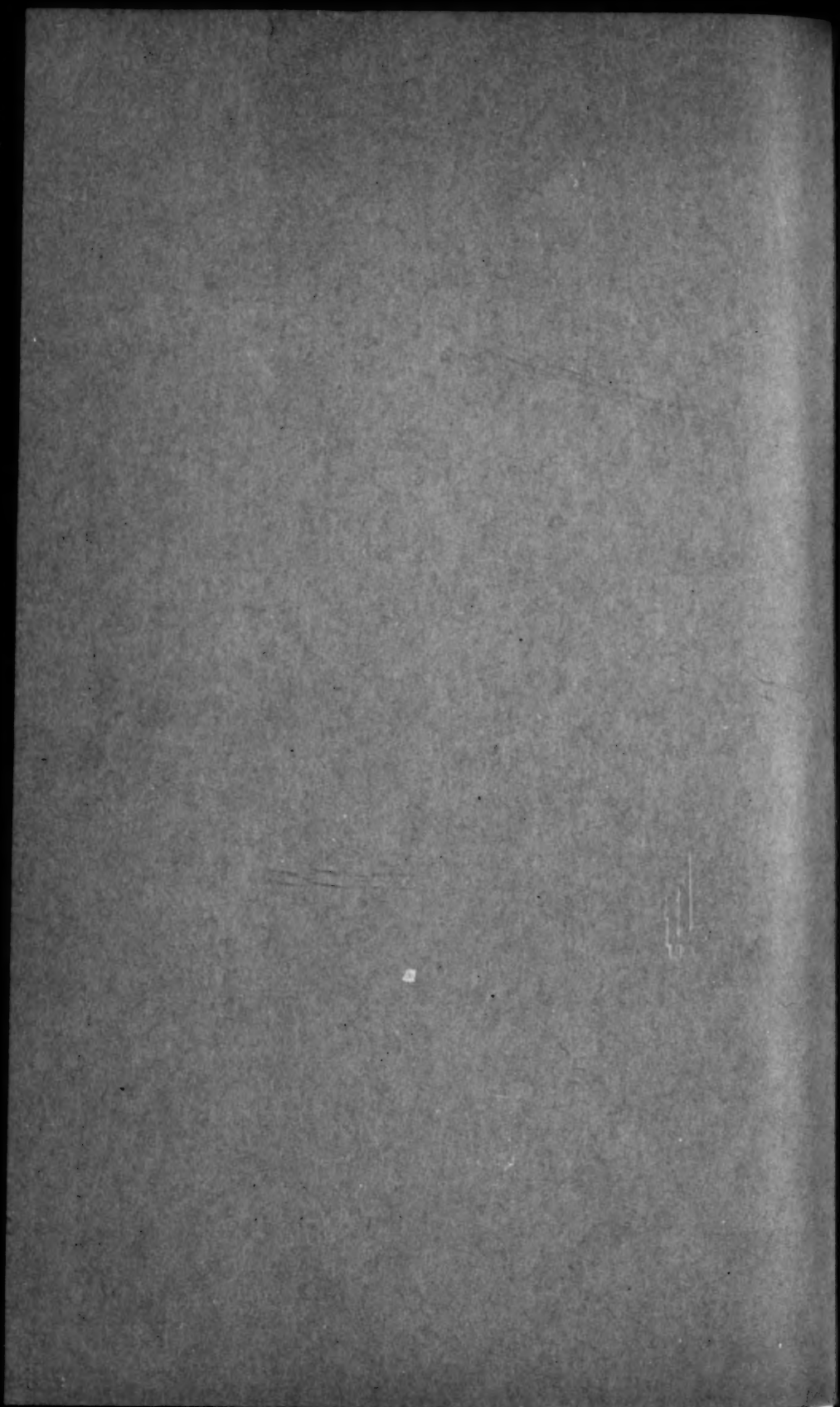

NEW SERIES, NO. 177 A (VOL. XXVII) MARCH, 1932
SUPPLEMENT

PROCEEDINGS OF THE AMERICAN STATISTICAL ASSOCIATION

Edited by HARRY C. CARVER

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NINETY-THIRD ANNUAL MEETING

OF THE AMERICAN STATISTICAL ASSOCIATION

HELD AT HOTEL WASHINGTON, WASHINGTON, D. C.

MONDAY, DECEMBER 28, TO WEDNESDAY, DECEMBER 30, 1931

PROGRAM

MONDAY, DECEMBER 28

10:00 A. M. *Section I*

Topic:
The Depression: The Functioning of Gold

Chairman:
Adolph C. Miller, Federal Reserve Board

Papers:
The World's Gold Production
Percy E. Barbour, Mining and Metallurgical Society of America[1]
International Aspects of the Gold Standard
John Parke Young, Occidental College
Central Gold Reserves, 1926-1931
Walter R. Gardner, Federal Reserve Board[2]

Discussion:
Lionel D. Edie, American Capital Corporation
Walter E. Spahr, New York University

10:00 A. M. *Section II*

Topic:
Criminal Statistics

Chairman:
C. E. Gehlke, Western Reserve University

Papers:
A Statistical Study of Adolescent Major Offenders, Ages 16-21 Years†
Harry M. Shulman, New York State Crime Commission
The Use of Selected Data for Predicting Outcome on Parole from Prison
Clark Tibbitts, University of Chicago*
Evaluating the Results of Penal Treatment
Bennet Mead, Department of Justice†

Discussion:
Thorsten Sellin, Bureau of Social Hygiene
George B. Vold, University of Minnesota
E. H. Sutherland, University of Chicago

10:00 A. M. *Section III*

Topic:
Public Health

Chairman:
T. F. Murphy, Chief, Division of Vital Statistics, Bureau of the Census

Papers:
A Proposed Test of the Degree to Which a Field Survey is Representative*
J. Lowell Reed, School of Hygiene and Public Health of Johns Hopkins University

[1]Not published.
[2]Will be published in the forthcoming *Economic Review*.
*Manuscript not submitted.
†Title has been changed, see Table of Contents.

The Epidemiology of Poliomyelitis
James P. Leake, U. S. Public Health Service*
Trends of Health in the United States
Rollo H. Britten, U. S. Public Health Service*

Discussion:
Lewis R. Thompson, U. S. Public Health Service
Maurice Leven, Committee on the Costs of Medical Care

10:00 A. M. *Section IV*

Topic:
Future Population and Business Planning

Chairman:
Seymour L. Andrew, American Telephone and Telegraph Company

Papers:
Population Trends and Some Probable Effects Upon Industry
Warren S. Thompson, Director of Scripps Foundation for Research in Population, Miami University
Will Slower Population Growth Mean Less Building?
Thomas S. Holden, F. W. Dodge Corporation*
Population Trends and Their Interest to the Telephone Industry
Fred H. Sterns, American Telephone and Telegraph Company*

Discussion:
Richard T. Ely, Director, Institute for Research in Land Economics and Public Utilities
Elmer C. Bratt, Lehigh University

10:00 A. M. *Section V*

Topic:
Social Statistics

Chairman:
F. Stuart Chapin, University of Minnesota

Papers:
The Probability of Divorce
Alfred Cahen, Columbia University
The Extent of Blindness in Certain States†
Evelyn C. McKay, Research Agent of the American Foundation for the Blind
Insanity Distribution by Local Areas
Robert L. Faris, Brown University

Discussion:
Ralph G. Hurlin, Russell Sage Foundation
J. P. Lichtenberger, University of Pennsylvania
Frank A. Ross, Columbia University

2:30 P. M. *Section I*

Topic:
Statistical Methodology

Chairman:
Malcolm C. Rorty, formerly Vice-President, International Telephone and Telegraph Company

Papers:
Approximation and Graduation According to the Principle of Least Squares by Orthogonal Polynomials
Charles Jordan, University of Budapest (Paper read by Harry C. Carver)[3]

[3]Will be published in the August, 1932, issue of the *Annals of Mathematical Statistics.*
*Manuscript not submitted.
†Title has been changed, see Table of Contents.

A Postulate for Observation
Robert Henderson, Equitable Life Assurance Society[4]
Numerical Integration Formulas for Functions of Several Variables
J. A. Nyswander, University of Michigan[5]
Index Numbers in Mathematical Economics[5]
George R. Davies, University of Iowa

Discussion:
Willford I. King, New York University
George A. Baker, Shurtleff College
James W. Glover, Teachers' Insurance and Annuity Association

2:30 P. M. *Section II*

Topic:
The Depression: Banks and Credit

Chairman:
Leonard P. Ayres, Cleveland Trust Company

Papers:
Bank Reserves
Winfield Riefler, Federal Reserve Board*
Brokers' Loans, Their Significance to Forecasters and Economists†
Lewis H. Haney, New York University
The Statistical Significance of Inflation
Virgil Jordan, McGraw-Hill Publishing Company*

Discussion:
E. E. Agger, Rutgers University
Herbert F. Boettler, First National Bank, St. Louis, Missouri
Frederic Bennett, Tucker, Anthony and Company

2:30 P. M. *Section III*—Joint Meeting with the American Economic Association and the American Association for Labor Legislation

Topic:
Technological Change as a Factor in Unemployment

Chairman:
Joseph Willits, University of Pennsylvania

Papers:
The Theory of Technological Progress and the Dislocation of Employment
Alvin H. Hansen, University of Minnesota[6]
The Measurement of Productivity Changes and the Displacement of Labor
Harry Jerome, University of Wisconsin[6]
Lines of Action, Adaptation and Control
Sumner Slichter, Harvard University[6]

Discussion:
Ewan Clague, Community Council of Philadelphia
Royal H. Montgomery, Cornell University
Boris Stern, U. S. Bureau of Labor Statistics
Albion G. Taylor, College of William and Mary

2:30 P. M. *Section IV*

Topic:
Census Enumeration Areas

Chairman:
Haven Emerson, College of Physicians and Surgeons, Columbia University

[4]Published in the February, 1932, issue of the *Annals of Mathematical Statistics.*
[5]Will be published in the November, 1932, issue of the *Annals of Mathematical Statistics.*
[6]See for reference the proceedings of *American Economic Association.*
*Manuscript not submitted.
†Title has been changed, see Table of Contents.

Papers:
Reliability of Rates Upon Different Sized Populations
Robert E. Chaddock, Columbia University
The Tabulation of Population Data by Census Tracts for Cities in the United States
Leon E. Truesdell, Chief Statistician for Population, Bureau of the Census
Composition and Characteristics of a Typical City Analyzed by Census Tracts
Howard Whipple Green, Secretary, Cleveland Health Council

Discussion:
Warren S. Thompson, Scripps Foundation, Miami University
Harry A. Wembridge, Comptroller, The Joseph & Feiss Company
Ernest W. Burgess, University of Chicago

8:15 P. M.

Topic:
Association Policy and the Promotion of Research:
The Organization of the American Statistical Association and its Policies

Chairman:
Frederick C. Mills, National Bureau of Economic Research
Report of Committee Appointed to Advise on Research in Statistics

General Discussion

TUESDAY, DECEMBER 29

9:00 A. M.
Business Meeting

10:00 A. M. *Section I*

Topic:
The Depression: General Causes

Chairman:
Henry Schultz, University of Chicago

Papers:
Formation of Economic Cycles
T. M. McNiece, Union Carbide and Carbon Company*
Forecasting Commodity Prices
Andrew T. Court, Court & Pryor, Inc.*
Gaps in Business Statistics
Donald R. Belcher, American Telephone and Telegraph Company*

Discussion:
Alvin H. Hansen, University of Minnesota
Morris A. Copeland, University of Michigan
Rex Tugwell, Columbia University

10:00 A. M. *Section II*

Topic:
Old Age in America

Chairman:
Mary van Kleeck, Russell Sage Foundation

Papers:
Distribution and Increase of Elders in Our Population†
P. K. Whelpton, Scripps Foundation for Research in Population Problems, Miami University
Employment of the Aged†
Solomon Barkin, National Institute of Public Administration

*Manuscript not submitted.
†Title has been changed, see Table of Contents.

Status of the Retired Teacher
Ilse M. Smith, Research Division, National Education Association
Old Age Pensions in New York State†
David M. Schneider, New York State Department of Social Welfare

Discussion:
Frank A. Ross, Columbia University
Alba M. Edwards, U. S. Bureau of the Census
Abraham Epstein, American Association for Old Age Security

10:00 A. M. *Section III*—Joint meeting with the American Economic Association

Topic:
Investments of Life Insurance Companies

Chairman:
Solomon S. Huebner, University of Pennsylvania

Papers:
Investments During the Depression of 1930-31
Robert Riegel, University of Buffalo[6]
Should Life Insurance Companies Be Permitted to Buy Common Stock?
Samuel H. Nerlove, University of Chicago[6]

Discussion:
Dwight C. Rose, Scudder, Stevens and Clark
Malcolm C. Rorty, formerly Vice-President, International Telephone and Telegraph Company
H. D. Corey, College of William and Mary
J. Lloyd Mahony, University of Pittsburgh

10:00 A. M. *Section IV*

Topic:
Economic and Business Statistics

Chairman:
Spurgeon Bell, Ohio State University

Papers:
Some Economic and Social Antecedents of Bankruptcies†
John H. Cover, University of Chicago
Productivity, Prices and Production Costs in Manufacturing Industries of the United States—1899-1929
Frederick C. Mills, National Bureau of Economic Research[7]
Statistical Problems Encountered by the United Fruit Company
A. R. Bailey, United Fruit Company*

Discussion:
Wilbur C. Plummer, University of Pennsylvania
George R. Davies, University of Iowa
Louis H. Bean, U. S. Department of Agriculture

12:30—Joint Luncheon with Social Science Abstracts of the Social Science Research Council

Topic:
Social Science Abstracts as an International Means of Intercourse in the Social Sciences

Chairman:
Davis R. Dewey, Massachusetts Institute of Technology

Papers:
Richard Thurnwald, University of Berlin
F. Stuart Chapin, University of Minnesota

[6]See for reference the proceedings of *American Economic Association.*
[7]Will be published in the forthcoming issue of *Economic Review.*
*Manuscript not submitted.
†Title has been changed, see Table of Contents.

Amry Vandenbosch, University of Kentucky
L. L. Bernard, Washington University
Laverne Burchfield, Social Science Abstracts[5]

2:30 P. M. *Section I*

Topic:
Trends in Welfare Expenditures

Chairman:
Stuart A. Rice, University of Pennsylvania

Papers:
Trends in Expenditures for Organized Social Work in New York City, 1910-1929*
Kate E. Huntley, Welfare Council of New York City
State Welfare Expenditures in New Jersey, 1900-1930
Emil Frankel, Director of Research, New Jersey Department of Institutions and Agencies*
Local and State Expenditures for Dependency Relief in New Jersey, 1929-1931
Emma A. Winslow, Research Director, New Jersey Pension Survey Commission*
The Amount and Method of Relief Expenditures in American Cities During the Depression of 1930-31
Ralph G. Hurlin, Russell Sage Foundation*

Discussion:
Raymond Clapp, Welfare Federation of Cleveland
Clarence Heer, University of North Carolina

2:30 P. M. *Section II*

Topic:
Round Table Discussion of Real Estate and Construction Statistics

Chairman:
John R. Riggleman, Division of Building and Housing, U. S. Department of Commerce

Papers:
Building Permits as a Basis for Analyzing Building Activity
John H. Cover, University of Chicago
Contracts Awarded, as a Basis for Analyzing Construction Conditions
L. Seth Schnitman, F. W. Dodge Corporation*
Progress in Standardizing Vacancy Surveys†
John R. Riggleman, U. S. Department of Commerce
Problems in Interpreting and Analyzing Vacancy Data
Ernest M. Fisher, University of Michigan*
Limitations of Financial Statistics Relating to Building Activity
William C. Clark, Queen's University
Statistical Needs in Analyzing Real Estate and Construction Conditions
H. Morton Bodfish, U. S. Building and Loan League

2:30 P. M. *Section III*—Joint Meeting with the Econometric Society

Topic:
Mathematical Economics

Chairman:
Frederick C. Mills, National Bureau of Economic Research

Papers:
The Measurement of Monetary Phenomena
Carl Snyder, Federal Reserve Bank[7]
Some Relations Between Commodity Prices and Business Activity
Holbrook Working, Stanford University[7]

[7]Will be published in the forthcoming issue of *Economic Review.*
[5]Published as a Summary.
*Manuscript not submitted.
†Title has been changed, see Table of Contents.

Some Demands of Economics and Forecasting on Mathematical Economics
Harry C. Carver, University of Michigan[8]
A Comparison of the Elasticities of Demand for Selected Commodities, Obtained by Different Methods (Illustrated)
Henry Schultz, University of Chicago[7]

Discussion:
Ray B. Westerfield, Yale University
Willford I. King, New York University
Frederick Waugh, Reading, Mass.
Horace Secrist, Northwestern University

2:30 P. M. *Section IV*

Topic:
Profits and Savings

Chairman:
Edwin F. Gay, Harvard University

Papers:
Stock Yields and Dividends in the Light of Corporate Gross and Net Earnings
Leland Rex Robinson, Second International Securities Company
The Growth of Corporate Net Incomes, 1909 to 1929
Samuel H. Nerlove, University of Chicago
The Effects of Deficits in National Savings
Malcolm C. Rorty, formerly Vice-President, International Telephone and Telegraph Company

Discussion:
David Friday, A. G. Becker & Co.
Ralph C. Epstein, University of Buffalo

8:00 P. M.

Presidential Addresses
Chairman: Hon. Ray Lyman Wilbur, Secretary of Interior
Statistics and Art
William F. Ogburn, University of Chicago
Social Process on the Pacific Coast
Emory S. Bogardus, University of Southern California, The American Sociological Society
Pushing Back the Frontiers
Ernest L. Bogart, University of Illinois, The American Economic Association

9:00 A. M.

Business Meeting

10:00 A. M. *Section I*

Topic:
The Depression: Financial Aspects

Chairman:
W. Randolph Burgess, Federal Reserve Bank

Papers:
Bank Credit and Depression
Lionel D. Edie, American Capital Corporation
Gold, Foreign Credits, and Depression
James Harvey Rogers, Yale University[10]
A Critique of the Current Monetary Interpretation and Treatment of the Depression
Alexander Sachs, Lehman Corporation

[7]Will be published in the forthcoming issue of *Economic Review*.
[8]Published in the March, 1932, issue of *Certified Accountant*.
[10]Will be published in the forthcoming issue of the *Yale Review*.

Discussion:
E. W. Kemmerer, Princeton University
Arthur W. Marget, University of Minnesota

10:00 A. M. *Section II*

Topic:
Statistical Methodology

Chairman:
Harry C. Carver, University of Michigan

Papers:
Some Fundamental Concepts of Mathematical Statistics
Burton H. Camp, Wesleyan College
Curvilinear Regression
Stephanus J. Pretorius, University of Chicago*
Linear Dependencies Among Statistical Variables and Their Effects Upon Regressions and Upon Correlation Coefficients
Bruce D. Mudgett, University of Minnesota*

Discussion:
Cecil C. Craig, University of Michigan

10:00 A. M. *Section III*—Joint Round Table with the American Political Science Association

Topic:
Political Science and Statistics

Chairman:
William F. Ogburn, University of Chicago

Papers:
The Straw Ballot and Election Prediction
Claude E. Robinson, Columbia University*
Statistics and Public Administration
Lewis S. Meriam, Brookings Institution*
Statisticians, Politicians, and Political Scientists
Harold F. Gosnell, University of Chicago*

Discussion:
Walter F. Willcox, Cornell University
F. Stuart Chapin, University of Minnesota
Phillips Bradley, Amherst College

10:00 A. M. *Section IV*—Joint Meeting with the American Farm Economic Association

Topic:
Demand for Agricultural Products

Chairman:
Howard R. Tolley, College of Agriculture, University of California

Papers:
The Shifting Demand for Selected Agricultural Commodities, 1875-1929 (Illustrated)
Henry Schultz, University of Chicago[11]
The Effect of a Business Depression Upon the Demand for Livestock Products and the Outlook for These Products
Warren C. Waite, University of Minnesota[11]
Indications of Changes in the Demand for Agricultural Products: Shifts and Trends Indicated by Some Studies Made in the Bureau of Agricultural Economics, U. S. Department of Agriculture
Elmer J. Working, Bureau of Agricultural Economics[11]

[11]Will be published in the April issue of *Journal of Farm Economics.*
*Manuscript not submitted.

Discussion:
Frank A. Pearson, New York State College of Agriculture
Wassily Leontief, National Bureau of Economic Research

10:00 A. M. *Section V*—Joint Meeting with the American Association for Labor Legislation

Topic:
Measuring Unemployment

Chairman:
Eugene B. Patton, New York State Department of Labor

Papers:
The Use of Current Employment Statistics in Estimating Unemployment
J. Frederick Dewhurst, U. S. Department of Commerce
An Index of Unemployment and Under-Employment in Philadelphia†
Emmett H. Welch, University of Pennsylvania

Discussion:
Isador Lubin, Brookings Institution
Ralph G. Hurlin, Russell Sage Foundation
George B. L. Arner, U. S. Bureau of the Census
M. C. MacLean, Dominion Bureau of Statistics, Canada

1:00 P. M.—Joint Luncheon with the American Farm Economic Association

Topic:
Prospects for Prosperity

Chairman:
Carl Snyder, Federal Reserve Bank

Papers:
David Friday, A. G. Becker and Co.
Leonard P. Ayres, Cleveland Trust Company
Louis H. Bean, U. S. Department of Agriculture

2:30 P. M. *Section I*

Topic:
Mental Disorders

Chairman:
Emil Frankel, New Jersey Department of Institutions and Agencies

Papers:
Life Tables for Patients with Mental Disease
Benjamin Malzberg, State of New York Department of Mental Hygiene
Alcoholic Mental Disease Before and After Prohibition†
Frederick W. Brown, National Committee for Mental Hygiene
Economic Loss to New York State and the United States on Account of Mental Disease
Horatio M. Pollock, Director, Statistical Bureau, State of New York Department of Mental Hygiene

Discussion:
Elbertie Foudray, U. S. Bureau of the Census
Ellen Winston, Raleigh, N. C.
Royal Meeker, New Haven, Conn.

2:30 P, M. *Section II*

Topic:
Round Table on the Measurement of Industrial Productivity, Occupational Obsolescence and Technological Unemployment.

Chairman:
Ewan Clague, Community Council of Philadelphia

†Title has been changed, see Table of Contents.

2:30 P. M. *Section III*—Round Table

Topic:
Some Applications of Statistical Technique to the Problems of Advertising

Chairman:
Alfred T. Falk, Bureau of Research and Education, Advertising Federation of America

Papers:
From the Standpoint of the Research Organization†
Daniel Starch, American Association of Advertising Agencies
From the Standpoint of the Advertiser
John W. Scoville, Chrysler Corporation*
From the Standpoint of the Advertising Agency†
Louis D. H. Weld, McCann Erickson, Inc.
From the Standpoint of the Publisher
Lloyd Sweeting, McCall Company*
From the Standpoint of the Marketing Consultant†
William J. Reilly, William J. Reilly Company

General Discussion.

2:30 P. M. *Section IV*

Topic:
Statistical Methodology

Chairman:
Robert Henderson, Equitable Life Assurance Society

Papers:
Probability from the Point of View of Admissible Numbers
A. H. Copeland, University of Michigan[12]
Some Remarks on the Spearman Two-Factor Theory
Cecil C. Craig, University of Michigan[12]
A Statistical Approach to Mathematical Formulation of Demand-Supply-Price Relationships[12]
Robert W. Burgess, Western Electric Company

Discussion:
J. A. Nyswander, University of Michigan
Burton H. Camp, Wesleyan College

2:45 P. M. *Section V*

Topic:
The Depression: General Causes

Chairman:
Warren M. Persons, Consulting Economist, Standard Statistics Company, General Motors, etc.

Papers:
Business Cycles: the Problem of Diagnosis
John M. Clark, Columbia University
The Immediate Cause of the Business Cycle
Willford I. King, New York University
The Competitive Production of Durable Products as a Factor in the Depression†
Arch. D. Schultz, Ohio Chamber of Commerce
The Exit from the Depression
Frederic Bennett, Tucker, Anthony & Co.

Discussion:
Professor Schulze-Gävernitz, University of Berlin
Charles O. Hardy, The Brookings Institution

[12]Will be published in Volume 4 of the *Annals of Mathematical Statistics.*
[13]Published in the February, 1932, issue of *Annals of Mathematical Statistics.*
*Manuscript not submitted.
†Title has been changed, see Table of Contents.

INTERNATIONAL ASPECTS OF THE GOLD STANDARD

By JOHN PARKE YOUNG

The meaning of the gold standard has undergone considerable change in recent years. A gold currency has come to mean a currency that is on a parity with gold, or with foreign gold standard money, regardless of the manner by which this parity is maintained. It includes the various forms of the gold exchange standard, the gold bullion standard and whatever other gold parity standards ingenuity may devise. Whether this parity with gold hangs by a mere thread, or whether it is secured by half the gold of the world, the fact of parity has come to be the test of the gold standard. Furthermore, the maintenance of parity is the principal aim of gold standard machinery.

The immediate maintenance of parity by any country is dependent upon the sufficiency of the gold reserve, including foreign gold credits. Sufficiency with reference to what, we may ask? Heretofore a reserve's sufficiency has been gauged largely by reference to its relation to domestic currency and credit.

Demands Upon Gold Reserves.

Gold reserves are said to support domestic currency and credit, and also to settle international balances. While the function of supporting domestic currency and credit has placed an increasingly light burden upon reserves, since gold is no longer used for hand to hand circulation, settling international balances has placed an increasingly heavy burden upon these reserves. Since the same reserve performs both these functions, (if they may be regarded as two separate functions), domestic currency and credit are thrown off the gold standard by heavy demands from the function of settling international balances.

The maintenance of the gold standard by any country, even a country of the position of Great Britain, is thus dependent to an important extent upon what happens in foreign countries. We have recently seen how a shift in the balance of payments may suddenly sweep away the foundations of countries' currency and credit. The domestic disruption is, of course, more formal than real, unless inflation should take place. Parity with gold, however, has been broken down, and therefore the gold standard.

In spite of the high degree to which domestic currency and credit are pyramided upon a small gold basis, domestic needs place little burden upon gold reserves.[1] In fact suspension of gold payments

[1] The United States in recent years has been the only principal nation in the world where a person could legally, and in practice, freely, get gold coin for circulation. The Bank of England, prior to suspension by Great Britain in September, 1931, was merely required to

means little to domestic business, (unless accompanied by inflation). In Great Britain the paper pound answers practically as well now as it did when redeemable in gold. Whether such a currency cut loose from gold will follow a course better or worse than before can not be determined. The merits and dangers of a managed currency, however, are outside the scope of this article. Suffice it to note that the raids upon gold reserves that have been responsible for the breakdown of gold parity have come almost entirely from abroad and not from domestic demands. The demands have had little relation to the size of the domestic credit structure, although they have not been unrelated to credit conditions.

The function of supporting—as it is called—domestic currency and credit, is exercised through the medium of free redemption. The chief advantage of redemption, as Ricardo long ago pointed out, is that it puts a check upon the quantity of currency that may be outstanding. This check upon excessive currency and credit, it is to be noted, however, does not provide any adjustment of the quantity of such currency and credit to the real needs of business. While it is a barrier against extreme excess, it provides no barrier against moderate excess in relation to business needs. Nor, conversely, does it give assurance that a sufficient amount of currency and credit will be available for expanding business. Such adjustments are obviously most important from the standpoint of economic stability. Any adjustments in this direction, other than those of accident, are the result of deliberate credit policy. They are not the result of any automatic functioning of gold reserves. In other words a reserve does not regulate domestic currency and credit in any desirable way.

Inasmuch as the regulation of currency and credit has increasingly become a matter of central banking policy, and is carried out with less and less regard to the gold reserve, and inasmuch as redemption for domestic purposes has practically disappeared, the reserve's function of supporting currency and credit has been pushed a considerable distance into the background.[1] While we are not yet ready to abolish reserves, we do not follow them as slavishly as formerly.

On the other hand, the function of settling international balances has become an increasingly important function. Since we have a variety of currencies, and since capital must be converted into specific currencies—pounds, francs, marks, etc.—and gold (or gold credits) is the only common denominator, or international currency, which can do this, the burden falls upon gold reserves. Gold reserves in this way provide the common link between gold standard currencies.

sell gold bars in amounts of not less than approximately $8,000. Gold was thus available for export and parity was maintained. A similar arrangement exists in France.

1 In the event of a series of first class bank failures in the United States, or some other catastrophe, a rush for gold might conceivably take place.

The chief duty of reserves is, therefore, to maintain foreign exchange parity, to maintain it against pressure from lack of balance in the flow of wealth and services into and out of a country. When there is a continued balance in one direction in a nation's foreign accounts, or when large balances suddenly appear for settlement, a strain is placed upon gold reserves which threatens the maintenance of parity. Between a paper standard country and a gold standard country, fluctuating exchange rates tend forcibly toward equilibrium in the balance sheet, but between gold standard countries the fluctuations in exchange rates are limited, and the process of adjustment in the balance sheet takes place slowly. Large balances therefore may be too much for the gold mechanism. Recent events have illustrated this.

It is not the flow of merchandise or services between countries that is subject to sudden and erratic fluctuations on a large scale. Lack of equilibrium from this source comes about gradually. The dumping of a country's currency upon the world's foreign exchange markets, the immediate cause of sudden depletion of reserves, and the breakdown of parity, may be a result of political disturbances, of deliberate attack, or it may have its roots in fundamental economic and financial conditions.

The large amount of short term credits and other liquid assets that nations hold in foreign centers has made possible this situation, and has been the immediate cause of the large balances that require settlement. Political and other disturbances, or the fear of them, cause these liquid funds to run to cover, and gold reserves are called upon to provide the ways and means.

The demands from abroad have in some instances been a result of domestic inflation, and the credit policy followed, but it would be difficult to show that this has always been the case. Parity has been broken down without there having been inflation, laxness of money rates, or depreciation of the domestic price level. We have had external depreciation independent of internal depreciation, external depreciation caused by the offering for sale of a country's liquid obligations on the international market.

Inasmuch as foreigners hold a large amount of our securities, short term and long term, and we similarly hold a large amount of foreign securities, we must be prepared to receive large quantities of gold, and to lose large quantities of gold. A huge body of securities exist which are readily marketable in the different financial centers of the world, and which, therefore, may be the immediate cause of sizable gold movements.

International financial transactions of unprecedented size have been taking place during the last decade. Reparation payments, allied debts, foreign loans and investments all involve large transfers of capital. Profound adjustments in the imports, exports and invisible trade of

practically every nation have been needed to facilitate these capital transfers. Extraordinary economic changes of recent years, tariffs and changes in political boundaries, also require adjustments in the flow of commodities and services. While capital transfers must ultimately take the form of merchandise or services, their immediate effect is to create a preponderance of debits or credits in the balance sheet. Until compensating adjustments in foreign trade can take place, the burden falls upon gold reserves.

The above factors are the principal ones that determine the extent and nature of the demands that gold reserves may be called upon to meet.

Credit Policy, Gold Parity and the Balance of Payments

Credit and price policies of central banks have not always been conducive to bringing about foreign trade adjustments necessary for equilibrium in the balance sheet. The fact that money rates and commodity price levels no longer respond promptly, or are as sensitive as formerly to an inflow or outflow of gold has interfered with these foreign trade adjustments. The uneven distribution of gold is in part a consequence.

Discount policies of central banks are at present not determined by the state of the gold reserves to the same extent as formerly. An outward movement of gold has not always been accompanied by stringency in the money market, nor has an inward movement always meant easy money. Frequently this is quite as it should.

In some instances, since gold does not play the important part in domestic affairs it used to play, credit has even been allowed to drift where it will without any definite credit policy, to be the creature of forces having little to do with the condition of the gold reserves. During the past year, however, nations have been forced to give heed to their gold reserves in a much more definite sense than they had become accustomed.

Attempts to maintain stable price levels and to adjust credit according to domestic needs, laudable as the attempts may be, have helped to bring about the uneven distribution of gold and the breakdown of gold parities. In order to facilitate foreign trade adjustments, and maintain gold parity, discount policies will have to consider gold reserves and the international balance sheet. The United States is fortunate in having a comprehensive and carefully prepared statement of this country's foreign transactions.

This brings us face to face with the dilema that the most desirable price and discount policy for internal purposes may not be consistent with necessary foreign trade adjustments, or with an even distribution of gold. The three factors which are to be reconciled with each other, but which may oftentimes be inconsistent, are as follows: first, fixed

exchange rates or parity with foreign gold currencies; second, internal price stability and a credit policy adapted to domestic conditions; and third, an increase or decrease in exports or imports—visible and invisible—which may be necessary for various reasons, such as to provide for the transfer of foreign investments. Herein is the heart of the problem.

A nation may be called upon to choose between gold parity, and domestic price and credit stability. If gold parities are to be maintained, and if international obligations are to be faithfully met, nations will have to adjust their domestic credit policies into harmony with their foreign positions. If a nation prefers to adjust its credit structure to domestic conditions, it may have to face the abandonment of gold parity. Fortunately for a country such as the United States, with a large gold reserve, considerable latitude exists for the adjustment of credit to domestic needs without threatening the gold standard. The present happy position of the United States, however, may not always continue.

The burden upon gold reserves of settling international balances is relieved by the foreign currencies which central banks hold, and which are used the same as gold in settling balances. At the same time, these foreign demand credits increase the burden upon the reserves of the country in which they are maintained. The large body of international credit holdings—short term and long term—while helpful in settling balances in ordinary times, in times of stress intensifies the difficulty.

The development and widespread use of the gold exchange standard has been partly responsible for the increase in the balances held in financial centers for foreign accounts. Reserves held in this manner earn interest, which fact accounts for the popularity of the practice. Pyramiding reserves, however, is a dangerous practice, especially unless carefully regulated. The weaknesses of the gold exchange standard have recently become too evident. A greater degree of cooperation and understanding in this field of international credit holdings is desirable, since what one nation does, or may do, affects all the rest.

Hopeful indications that a solution to gold difficulties is practical are found in the interesting fact that the extraordinary large movements of capital that preceded the recent abandonments of the gold standard, were provided for largely by means of credit arrangements, and only to a relatively small extent by the physical movement of gold. In the case of Great Britain, suspension was precipitated by the withdrawal from London during the previous two months of funds to the extent of about one billion dollars. Yet during this time the gold reserves of the Bank of England declined by only a little over $100,000,000. The funds were transferred by credit arrangements. A similar situation existed in the case of Japan.

The stability of the German currency has been maintained by credit

devices based upon international agreement. In the case of Germany, however, while parity has been maintained, the balances have not yet been settled.

The Gold Settlement Fund in the United States amounts to a little over half a billion dollars, and of this sum about thirty per cent moved during 1929, a year of great business activity. Yet during that year the transactions cleared through the Fund amounted to as much as 153 billion dollars. This indicates that the existing gold reserves of the world can by proper devices be made to do the work expected of them. However, in the case of international settlements, as opposed to domestic settlements, we have different currency units into which the balances must be converted.

In order to facilitate the settling of international balances, and to avoid undue strain upon the gold mechanism, attention will have to be directed to the further development of credit devices which are used to settle balances. These devices give nations more opportunity to bring about necessary domestic adjustments, without jeopardizing gold parities.

To what extent credit policies in the past have not been in harmony with necessary domestic adjustments, in view of a nation's foreign position, need have no bearing upon the desirability of providing, if such be possible, ways and means for countries to protect their currencies from foreign pressure or sudden attack, until domestic adjustments can be accomplished. In view of the changed practices in the field of international finance, and the intimate financial relations between nations, as well as the huge size of the transactions, it is doubtful whether the gold standard mechanism as now constituted will be able to do the work expected of it in any but normal times. It will not be a standard for rainy days. Yet if international transactions are to proceed with confidence we must have reliable standards for the conduct of these transactions.

Elasticity in Means of International Settlement

Present means for making international payments have little elasticity. A nation may be likened to an individual who has plenty of good assets, but who has little ready cash to meet heavy demands of creditors, demands that though they may be hanging over his head, may or may not be presented for immediate payment. The demands of foreign creditors are for cash, which means gold or gold credits. Other assets are acceptable only in an imperfect sense.

A country that is subjected to a run on its gold reserve is as helpless as a bank under the old banking system in the United States, which might have had sound assets, but which was unable to provide cash to meet an extended run, such as took place in 1907. Centralizing the world's gold reserves, and making available such reserves to central

banks through rediscounting, can not be done as simply as was done by the Federal Reserve System for the United States. Countries are not banks. Banks do not have price levels to worry about in the same sense as do countries.

The concentration of a part of the world's gold in an international fund, and the granting of credits on this fund to central banks, credits internationally guaranteed, would help to provide needed elasticity in the means of making international settlement. At the same time, such concentration, by making gold more efficient, should help to provide against a possible fall in the price level, should a shortage of gold develop. It would push back one of the limitations to stabilizing the value of gold. On the other hand, a possible danger of such an arrangement is that credits granted to rediscounting central banks might be used to perpetuate unsound credit conditions within the country, rather than to tide the country over an emergency period.

Such a program is probably impractical at the present time. The world is not ready for this degree of cooperation. Nevertheless some such arrangement must eventually come if transactions between nations are to continue to grow. It is encouraging that the Bank for International Settlements has made such substantial progress in this direction.

Legal requirements regarding reserves have in the past been based upon the thought that the ability of reserves to meet demands put upon them, depends upon their ratio to domestic bank deposits and currency in circulation. This guide, at one time a fairly reliable one, is no longer sufficiently complete, as already noted. The sufficiency of reserves to maintain gold parity is no longer measured primarily by the size of the domestic currency and credit structure, but is determined by demands which come principally from abroad, and which are international in nature. Liabilities to foreign countries are included in the domestic credit structure only in so far as these foreign liabilities are in the form of bank deposits in the country in question.

If we are appraising the possibility of a particular country's continuing upon the gold basis, we consider the reserve in relation to the country's international position, including political conditions. For example, the boycott of Japanese goods in China cut heavily into Japan's export trade, and was a factor in Japan's leaving the gold standard.

The removal, or relaxation, of legal requirements regarding reserves for central banks, a proposal voiced frequently of late, has much to commend itself from the standpoint of maintaining gold parity. Leaving the matter of the amount of reserves, more to the discretion of central bank authorities would give reserves more elasticity in performing their function of settling international balances.

Too much sacredness has come to attach to legal reserve requirements. If a nation's reserve approaches the minimum, consternation

results, and the situation is made worse. A reserve that might have been adequate is made inadequate by the very law that is meant to protect the currency. A misconception regarding the purpose of reserves has developed in the minds of the public which often regards a reserve as an end in itself.

If reserve requirements were liberalized and the halo around legal minima removed, central banks would be able to utilize a larger portion of their reserves for settling these balances, and would therefore be in a stronger position to maintain gold parity.

The gold that is available for use at present is that above the legal minimum. That below the minimum lies idle, and can not be used in the normal course of affairs. If it is used and a penalty paid, popular apprehension is aroused out of proportion to the seriousness of the event. The interim report of the Gold Delegation of the League of Nations has shown that excess reserves over the average minima amount to between six and twelve per cent. The portion of the world's monetary gold that is active, and called into actual operation is thus only a small percentage of the whole.

Legal requirements give rigidity to the credit system, where adaptability is needed. Central bank authorities should be given as much latitude as possible to adjust credit to the needs of trade. This is desirable for domestic economic stability as well as for the maintenance of gold parity. With reserve requirements removed the danger of inflation is, of course, to be guarded against.

The breakdown of the gold standard has contributed to the continuation of the depression. The restoration of the gold standard, as soon as this may be possible, will help to restore economic stability and public confidence. Countries that have recently gone off the gold standard should immediately begin to make plans for its reestablishment. Serious consideration of ways and means for the rehabilitation of the gold standard would in itself help to restore confidence. When a structure collapses, wisdom dictates that plans for reconstruction promptly get under way. Now is the time to examine the question of the gold standard and what can be done not only to restore it, but, most important, to see what can be done to give it greater security, and at the same time to provide latitude for controlling domestic currency and credit according to business needs.

A STATISTICAL STUDY OF YOUTHFUL OFFENDERS IN NEW YORK CITY

By HARRY M. SHULMAN

The youthful offender, who represents an exaggerated phase of society's inept relations to the whole adolescent group, is perhaps the most interesting and definitely the most neglected phenomenon in the entire literature and practice of criminology and penology.

He occupies a No-man's Land in more ways than one, being interstitial to many of our forms of community control. By and large, he is freed from the controls of compulsory education, is least represented among the membership of our national and local recreation movements and institutions, belongs to an occupationally-unstabilized group subject to particularly grave unemployment in times of depression, and in our great cities has been almost neglected by protective organizations concerned with the rehabilitation of individual delinquents, in comparison with the efforts exerted in the reclamation of children of the juvenile court age.

Nowhere is the anomalous position of the youthful offenders within society more clearly revealed than in the contrast in their status under the civil and the criminal law. The civil law sets restrictions and provides protections of numerous kinds for all children under the age of twenty-one years, whereas the criminal law, following the English Common Law, as amended by statute, grants to children in the various states of our Union, save in a few exceptions, no protection beyond the age of sixteen years. Whereas a child in the United States may not buy or sell or otherwise contract personal obligations for which he may be held fully responsible, he may at sixteen be held equally responsible with mature adults for infractions of our criminal law. Thus our law protects the minor in his exercise of immature judgment in the field of contracts, but leaves him open to harsh penalties in connection with the exercise of immature judgment in matters of conduct.

For reasons such as the foregoing, the entire youthful offender group deserves special study and consideration. Yet a survey of criminological literature reveals an almost complete neglect of the adolescent offender as an object of special study and analysis, the first adequate study, that of the United States Children's Bureau, entitled "Youth and Crime," a study of the prevalence and treatment of delinquency among 17-20 year old boys over juvenile court age in Chicago, being published in 1930. During the same year, the Sub-Commission on

Causes of the New York State Crime Commission engaged, under the writer's direction, in a statistical study of crime and criminal justice among 16-20 year old boys over Children's Court age in New York City.

This survey volume, "The Youthful Offender,"* deals with five aspects of the phenomenon of crime among the adolescent group:

a) Frequencies of crime statistics among 16-20 year old offenders in New York City by type of offense, age and sex, for 1929, 1930, as compared with similar data among adult offenders.
b) The ecological distribution of residences of young offenders, and crime ratios by population areas, in New York City.
c) The social backgrounds of a sampling of young prisoners in relation to sentence.
d) The operation of criminal justice among young felons and serious misdemeanants, as compared with adult offenders arraigned on the same charge.
e) A survey of proposals for the modification of criminal procedure in dealing with this age-group of offenders.

The scope of this paper, which will deal primarily with section four, the operation of criminal justice among young felons and misdemeanants, allows for the presentation of only the most general findings of the other sections of the survey:

Criminal Statistics Among Youthful Offenders

Adolescent youth in New York City was, during 1929, responsible for more than its share of major crime, arrests on felony and serious misdemeanor charges among the 16-20 year old group of boys being 47.8 per thousand of population of similar age, compared to an arrest index of but 39.60 per thousand among the general population, including the adolescent group. This disproportionate contribution of youthful arrests may be on the one hand due to disproportionate police activity among that age group, or to actual increased criminality. The disposition of cases among adolescents as compared with adults favors the latter interpretation.

Charges against adolescents most frequently involved offenses whose commission incurred danger, physical courage and adventure. The major offense of adolescent youth was auto theft. More than one-half, 54.5% of all arrests among the entire male and female population of the city on the charge of auto theft, were among boys ages sixteen to twenty, inclusive. The significance of this figure may be gauged from the fact that *all* arrests on all charges among this age

*"The Youthful Offender, a Statistical Study of Crime Among the 16-20 Age Group in New York City," by Harry Shulman. Published by the New York State Crime Commission, Albany, 1931.

group of boys represents only 9 per cent of all arrests among all ages in the city. Burglary, a serious felony, was in 30% of all arrests on this charge attributed to boys in the 16-20 age group. Robbery, a more serious felony, in 25% of all arrests, was charged against this age group. One-third of all rape case arrests, for assault on girls between fourteen and eighteen years of age, were made among this age group. These four offenses accounted for over 67% of the arrests among the adolescent age group.

A study of the ecological distribution of residences of youthful offenders revealed quite wide-spread distribution throughout the entire city, however, with a tendency to unusual concentration of cases in ten small areas, eight in New York City proper, one in Brooklyn and one in the Bronx.

An examination of the social backgrounds of 110 young prisoners disclosed that judges, in pronouncing sentence, did not consider the reports of probation officers a valid basis for sentence, for best and worst cases, in point of social background, were sentenced indiscriminately to various institutions of various degree of stigma and of severity.

The Operation of Criminal Justice Among Adolescents.

This section of our survey is a study of the operation of criminal justice among the lowest age group arraigned in the criminal courts of New York City, on felony and serious misdemeanor* charges, during the calendar year, 1929. It provides data relative to the following questions:

a) With what crimes were they charged?
b) How did these charges vary by age, sex, and previous record?
c) What dispositions were made by the courts in these cases?
d) How do these dispositions compare with those among the adult population arraigned on similar charges?

Sources of Data.

This study of criminal justice among adolescents deals with the mortality of arrests and arraignments at every major step in the judicial process, from arraignment before an examining magistrate of an inferior criminal court, to the final disposition. Such a study would have encountered formidable obstacles, had there not already existed a basis of adequate criminal records. Fortunately, we have had in New York State, since 1928, a system of records which makes possible a study of dispositions both of felony and misdemeanor cases, without the necessity of consulting official papers or court dockets.

*Unlawful entry, burglar's tools, carrying concealed weapons, possession of narcotics, jostling, aiding an escaping prisoner.

The key to this record system is a form known as Schedule III, the History of the Case, which accompanies every felony and serious misdemeanor charge from the point of booking at the police station through to final disposition. The original entries, describing the nature of the alleged offense, the place of occurrence, the true name and aliases of the prisoner, his residence, race, sex, age, and certain other social data offered by the prisoner, such as nativity, education, occupation, marital status, and habits, etc., are recorded by the desk lieutenant who makes the formal entry of arrest. After finger-printing, his previous record, if one exists, is added to the reverse side of the schedule. At every subsequent point in the procedure, as before the examining magistrate, the grand jury, and before the trial magistrate, the disposition is recorded by the clerk of the court, grand jury dispositions being recorded by the clerk of the criminal court. Upon final termination of the case, the original schedule is sent to the Division of Statistics of the New York State Department of Correction, and a carbon duplicate is filed with the chief of police in whose jurisdiction the arrest was made. Our tables are drawn from the duplicate schedules III filed with the New York City police department.

The major offenses charged against the 16-20 group, while falling into 33 distinct categories, have been classed into 6 more or less homogeneous classes, in accordance with the recommendation of the Committee on Uniform Crime Records of the International Association of Chiefs of Police.* These are:

1. Property offenses.
2. Property offenses involving the person (as robbery).
3. Aggravated assault (including murder).
4. Sex offenses.
5. Civic violations (carrying dangerous weapons, burglar's tools, and possessing narcotics for distribution).
6. Non-negligent homicide (vehicle accidents).

Within each class of offense there has been a sub-division of data into numbers of first offenders, of previously convicted offenders, and previously arrested non-convicted offenders.

TABLE XX

Frequencies of Offenses by Major Offense Classifications

Offenses	*First Offender*	*%*	*Convicted Prev. Offender*	*%*	*Not Convicted Prev. Offender*	*%*
Property crimes	1,527	28.53	568	14.33	115	2.90
Property crimes involving the person	394	9.94	248	6.26	46	1.16
Assault	306	7.72	58	1.46	22	.55
Sex Offenses	291	7.34	52	1.31	17	.43
Civic Offenses	111	2.80	53	1.34	3	.08
Non-negligent Homicide ..	10	1.25	7	.10	1	.02

*Uniform Crime Reporting, published by the International Association of Chiefs of Police, 1929.

From this table it may be seen that property offenses are the most frequent among this age group and that attacks on the security of the person for monetary gain and aggravated assault are next in order. It will be seen that sex-offenders tend to be first offenders, and that violence to the person is primarily among first offenders, but that offenses threatening the security of the person for monetary gain are of frequent occurrence among repeaters. The majority of arraignments are among boys, only 134 or 3.38% having been among girls. Among the boys, 66.59% were first offenders, 24.88% had previous records of conviction, and 5.15% had been previously arrested but not convicted. Thus while 2-3 of those arraigned during 1929 were first offenders, one-third had previous arrest or conviction records. The tendency toward professionalism in certain offenses is seen from a comparison of the six leading offenses among the first and previous offenders.*

PROPORTION OF OFFENSES IN RELATION TO AVERAGE FOR GROUP

Offenses	*1st Offenders*	*Convicted*	*Non-convicted*
Auto Theft	8	7 1/2	9
Burglary	6 1/3	8 3/4	8 2/3
Robbery	3 1/3	7	7
Rape	3	1 1/2	2
Felonious Assault	3	1 4/5	3 1/3
Larceny over $50	2 1/5	1 1/2	.9

From this table it may be seen that the proportion of arraignments for auto theft is almost equally among all groups, that those arraigned for rape and larceny tend to be first offenders, and that those arraigned for burglary and robbery are found in increased frequency among those with previous records of arrest, or conviction.

Analysis of the arraignments by age, for the six major offense groups, gave the following table:

TABLE XXI

Frequency of Crimes by Age Groups. Males, Ages, 16-20.

Offense	*Ages* 16		17		18		19		20	
	No.	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*
1. Property crimes ...	419	10.57	507	12.79	491	12.39	422	10.65	371	9.36
2. Property crimes involving the person..	45	1.13	126	3.18	153	3.86	206	5.20	158	3.99
3. Sex offenses	32	.81	55	1.39	85	2.14	91	2.30	97	2.45
4. Assault	20	.50	62	1.56	100	2.52	99	2.50	105	2.65
5. Civic Offenses	26	.66	29	.73	41	1.03	37	.93	34	.86
6. Non-neg. Homicide.	0	0	1	.02	8	.20	5	.13	4	.10

*Since the three groups of cases were unequal, the inequality was overcome by determining the average per cent for each group, and relating to this average the percentage for each offense, for each group. The number of times it exceeded the group average represented its relation to the per cent for the same offense in the two other groups.

From this table it may be seen that arraignments for property crimes, as burglary, auto theft and larceny, are affected very slightly by age, but that arrests and arraignments for offenses 2, 3 and 4, involving attack on the person, do increase with age. Thus the generalization might be made that increasing maturity brings with it increasing disregard, both for danger, and for the persons of others. Thus, the older adolescent is perhaps a more dangerous offender than the younger adolescent.

The Young Felony Offender and the Court.

New York State does not differentiate its criminal procedure for offenders between 16 and 21 years, and those above 21. All are dealt with by the one uniform process. An interesting question is whether the courts show any appreciable difference in their dispositions of young and mature offenders, as determined by types of disposition, whether such a difference is in the direction of leniency toward young offenders, and if in that direction, whether more marked for siderations of sentiment are detectable in the judicial process, or whether justice operates inflexibly, without regard to age. In other words, we might ask whether a degree of individualization of adjudication has been possible under a uniform code and procedure, or whether those seeking discriminatory judicial disposition of young and adult offenders must seek further legal remedies.

In order that we might compare dispositions among adolescents with dispositions among all ages, it was necessary to obtain comparable data based on similar offenses. While such a comparison could not be made for dispositions during 1929, there was available for comparison purposes, the dispositions on 8,144 unselected felony arraignments among adults in all Boroughs of New York City, during 1926, analyzed by Professor Raymond Moley for the Sub-Commission on Statistics of the New York State Crime Commission. A true comparison was possible, as both were unselected groups of cases, the legal classification of offenses and punishments had been practically identical in both years and the procedure had been likewise unchanged.* No like comparison could be made for our misdemeanor series, since no city totals were available for 1926.

The comparison has been made of the two groups of cases at every important step in the procedure, viz: At the preliminary hearing, in the Grand Jury, and before the trial court. (In New York State, all pleadings to guilt in the preliminary hearing are nevertheless held for the grand jury). The comparison made has been between eliminations, for they are the most significant measure of comparison. A pris-

*The most important changes in the Penal Code had been carried out in 1925 by the Baumes Legislative Committee, prior to the establishment of the New York State Crime Commission.

oner held on a felony charge may be eliminated either by a discharge or a dismissal, or by a reduction of the charge to that of misdemeanor. In either event he has won a victory over the law, as he either goes free, or stands trial or pleads, on a charge for which the penalty is relatively slight, compared to the original charge. The question then, is: Which group, the adolescents or the mature offenders, win the greater victory over the law through eliminations? The following tables give the comparison of eliminations:

TABLE XXVII

Disposition of Felony Arraignments in New York City

	Adolescents, 1929		*All ages, 1926*	
	No.	*Pct.*	*No.*	*Pct.*
Guilty of felony	470	12.72	888	10.90
Guilty of misdemeanor	1,076	29.05	817	10.
Not guilty	34	.91	....	....
Misdemeanor dispositions not known	....	....	1,360	16.67
Dismissed or discharged	2,023	54.70	4,460	54.76
Acquitted of felony	91	2.46	227	2.75
Other dispositions	3	....	392	4.92
Totals	3,697	100.00	8,144	100.00

Thus, we see (Table 27) that among the adolescent group, 12.72% were found guilty on felony charges, and 29.05% on misdemeanor charges, a total of 41.77% who were found guilty in some degree. Discharged, dismissed and acquitted cases totalled 58.07%. Compared with these are the city totals for 1926, wherein 59.51% were dismissed, discharged, or acquitted, 10% found guilty on misdemeanor charges and 10.9% on felony charges, or a total of 20.9% guilty. In 16.67% of cases, where there were reductions to misdemeanors, the dispositions have not been reported, 0.90% cases were pending or had been transferred to other jurisdictions. If every single city total case whose disposition is unknown were to have been declared guilty (and this is unlikely) the convictions among city totals would have exceeded convictions among adolescents by but seven-tenths of one per cent.

On the basis of these tables we may conclude that adolescents in 1929 were no more successful in avoiding conviction than were all felony cases in 1926, and that the probability is that they were somewhat less successful.

The Punishment of the Guilty Group.

An examination of the punishments meted out to adolescents and city totals (Table 28) indicates that the use of the suspended sentence favored the adolescents very slightly, that the use of the indeterminate sentence favored the adolescents greatly, and that long terms were somewhat more common among city totals. The use of indeterminate sentences among adolescents served to segregate them in a state

TABLE XXVIII

Felony Dispositions, Adolescents, 1929, City Totals, 1926, New York City

	16-20 Total	%	City Total	%
Total No. of Cases	3,697		8,144	
To Grand Jury (BW)	52	1.41	....	....
Discharged or dismissed	1,283	34.69	3,255	39.97
Charge reduced to misdemeanor	245	6.63	1,308	16.06
Sentenced in Magistrate's Court	129	3.49	....	....
Held for Special Sessions	116	3.14	....	....
Total eliminated in Preliminary Hearing	1,527	41.32	4,778	58.67
Discharged in Special Sessions	24	.65	....	....
Acquitted in Special Sessions	34	.92	....	....
Total found guilty in Special Sessions	149	4.03	....	....
Dismissed by Grand Jury	491	13.26	840	10.31
Charge reduced by Grand Jury and case sent to Special Sessions	91	2.46	....	....
Total Eliminated in Grand Jury	581	15.72	844	10.36
Indicted by Grand Jury	1,584	42.86	2,522	30.96
Disposed of as Misdemeanor in County Court	798	21.59	869	10.67
Acquitted in County Court	91	2.46	224	2.75
Dismissed in County Court	225	6.09	365	4.48
Total Eliminated in County Court	1,114	30.01	1,634	20.06
Total Guilt Est. on Felony Charge	470	12.72	888	10.90
Convicted—Offense Charged	21	106	101	1.24
Convicted—Other Offense	33	.09	55	.67
Sentenced—Guilty Plea	416	11.52	732	8.99
Sentence Suspended	91		141	
Probation	38		26	
No Probation	53		115	
Punished	379		747	
Death	....		3	
Life sentence	1		19	
Indeterminate	246		126	
Less than one year	15		166	
Minimum one year	4		68	
One and one-half	3		....	
Two	11		110	
Two and one-half	9		....	
Three	11		45	
Four	5		11	
Five	22		61	
Six	4		16	
Seven	7		25	
Seven and one-half	11		....	
Eight	2		4	
Ten—fourteen	11		30	
Fifteen—nineteen	7		18	
Twenty—Twenty-four	1		24	
Twenty-five—twenty-nine	3		3	
Thirty or over	6		15	
No information	....		3	

reformatory instead of a state prison—thus these sentences were following the established penal policy of the state. In general, the adolescent, where there was no penal policy to guide the judiciary, was somewhat more leniently treated with regard to sentence than were the city total group, but an appreciable number of very long terms were given to young offenders.

The Machinery of Justice.

We have, up to this point, considered the outcomes of the judicial procedure as they affected the adolescent group of offenders. These outcomes represent the ends of justice, which are to be carefully differentiated from the mechanics of justice. While to the individual boy offender, huddled in his detention cell, awaiting trial, the ends of justice may loom up as the most important—whether he will go free or must be imprisoned—yet there are procedural influences which serve to put their imprint on him and which are not subject to judicial decision. They are influences which must give him a lasting impression of the nature of justice, whether he goes free or is sentenced. Among these influences are assignment of counsel, the plea, reductions in charge, bail and detention.

Assignment of Counsel.

The use of assigned counsel is slight. Of 3,829 cases of boys arraigned on serious charges during 1929, only 287 accepted the services of assigned counsel. This, in view of the low economic status of so many of the families concerned, as seen in our section dealing with the social backgrounds of young offenders, indicates almost complete reliance on private counsel. The fact that the defense of criminal charges among youths is so largely in the hands of private criminal lawyers is to be remembered in connection with the experiences of these youths during the course of trial.

The Plea.

The plea of the offender has profound psychological significance. The young offender, when he is arrested is subjected to searching and often brutal inquiry by the police, as we have indicated in our section dealing with that subject. He very frequently makes a confession. When placed in the police line-up, he nearly always admits the truth of the accusation. Whether these confessions and admissions are true, or are prompted by fear, we do not know, but when he reaches the stage of the preliminary examination, however, the proportion of pleas of "not guilty" increase tremendously, for 34.69% of felony cases among adolescents in 1929 were there dismissed and the defendants discharged on their pleas of innocence. Those who are held for the grand jury include both pleaders to guilt and no guilt. Of these, 13.26% undoubtedly pleaded "not guilty" as these were dismissed by the grand jury. There remains 42.86% of the original arrests. This remaining group now came into the county courts, some pleading "guilty" and others "not guilty." In the county court, however, a great apparent change in attitude took place, and 1,214 out of a total of 1,584 indicted by the grand jury, elected to plead guilty. That the changes in plea which took place in the county court, as recorded by

our Schedules III, were all in the direction of guilt, is easily established by two lines of fact: *a*) Every change in plea was accompanied by a reduction in charge; *b*) of the 1,584 indictments, 316 resulted in dismissals, acquittals, and convictions, following trial. Manifestly all of these must have been pleas of "not guilty." The remainder is thus 1,214 cases, which co-incides exactly with the number who changed their pleas. That the maneuver had some practical value is seen in the fact that *every plea* was accompanied by a reduction in charge on the part of the court, and 798 out of 1,214 cases were sentenced on misdemeanor charges instead of on felonies.

The fact that seems significant here is that 1,214 boys entered the criminal court pleading "not guilty" on advice of counsel, and later changed their plea to "guilty," again on advice of counsel. *If they were all truly guilty,* then they were going through the significant psychological experience than *justice can be bargained with.* If some were *innocent,* a more grim conclusion stares us in the face.

Bail.

Unless a young offender is able to obtain bail, he is obliged to spend his time in confinement. Since confinement in New York City detention prisons carries with it grave moral and physical risks, the matter of bail brings in its train significant psychological resultants. The facts from our tables disclose that the vast majority of young offenders do not secure bail. 78% were held in prison awaiting the grand jury, and of those held by the grand jury, 81% remained in custody until final disposition in the trial court.

Time Elapsing.

In 60% of the cases, justice was reasonably prompt, dispositions taking place within one to thirty days. In 40% of the cases, there were delays ranging from 30 days to over six months, 21% or 822 cases requiring 31 to 60 days for disposition, and 753 cases or 19% requiring from two to six months.

Summary.

The process of criminal justice, which in New York City is on a very low plane, involving as it does a cumbersome procedure, antiquated detention institutions, frequent unwarranted delays, practical abandonment of the use of the jury, and wholesale use of the bargaining process between prosecutors and criminal lawyers, sanctioned by the bench, is hardly suited to the delicate task of judging the adolescent offender and dealing with him wisely. The adolescent offender is dealt with under the identical procedure and held subject to the same penalties as are adult offenders, in contra-distinction to his status under the civil law, and this, in practice, as seen from our analysis of elimi-

nations, results in the operation of the criminal law among adolescents with practically the same degree of severity as among adults, save where the penal system has been modified by governmental policy. In view of the special nature of the social problem of the adolescent it is suggested that further attention be given to the study of this group of offenders, and to proposals for the provision of separate procedures for their judicial treatment, as represented by such innovations as the extension to twenty-one years of the age-limit of the juvenile courts, the establishment of special boys' courts, of boys' and girls' felony courts, and the provision of modern clinical and social investigation facilities, and especially trained magistrates and judges.

EVALUATING THE RESULTS OF CORRECTIONAL TREATMENT

By BENNET MEAD

In this paper, the chief objective is to attempt the formulation of a plan for measuring the results of correctional treatment. This objective, stated in terms of the individual offender, is to devise a procedure for measuring changes in the personality and conduct of the offender, which are due to the specific methods of treatment applied by the correctional agency.

The chief forms of correctional treatment[1] now used in this country are: (1) Imprisonment; (2) Parole; (3) Probation.

The chief types of comparison which an evaluation plan would make possible are: (1) Historical comparisons for a given institution or agency; (2) Comparisons between separate institutions or units which are under the same administrative head; (3) Comparisons between correctional systems or agencies which are under different administrative heads.

The chief emphasis will here be placed on securing a basis for historical comparisons. In fact, this paper has developed from a study of the problem of evaluation recently made at the request of Mr. Sanford Bates, Director of the Federal Bureau of Prisons, who has described the need for evaluation in these words:

"In the development of our new Prison Bureau and in the setting up of new systems in our institutions we have had, of course, but one object in mind, and that is, to so order our institutional discipline that prison inmates will be less likely to relapse into crime on their release.

"After all our theorization, there is but one way in which this new procedure can be proved, and that is to compare the amount of recidivism among the inmates and measure whatever improvement, physical, mental or behavioristic they show.

"I wish you would prepare a scheme and submit it to me whereby your statistical division can so procure and collate the necessary information that we shall have in future years authentic means to check up on the efficacy of our systems. Heretofore we have been dealing in assumptions. It is time we laid the proper statistical foundations to be able to prove our point."

I shall consider, first, to what extent mass statistics of recidivism may be used for evaluating the results of correctional treatment. We

[1] No attempt will be made to deal with financial penalties, which might be considered a fourth type of treatment, but which, unless used in conjunction with probation, have practically no correctional value.

learn from the 1928 census statistics of state and federal prisons and adult reformatories, that of the prisoners received during the year, 56.5 per cent were known to have been previously imprisoned in one or more institutions. Furthermore, these statistics are incomplete, and therefore represent a considerable understatement of the full extent of recidivism. Identification facilities are lacking in many localities, and there is insufficient development and use of such machinery in most of the places where it does exist. In spite of the phenomenal growth of the national clearing house for finger prints maintained by the United States Department of Justice, many local agencies of law enforcement still do not cooperate as effectively as they might with the national bureau. This bureau, over a period of years, has now accumulated more than 2,000,000 finger print records, and receives over 400,000 prints a year. But it is clear that this represents only a small proportion of the millions of offenders taken into custody annually.

None the less, in spite of their incompleteness, the statistics of recidivism do throw some light upon the results obtained in general by the present processes of correctional treatment. Such figures show that a very large proportion of the offenders discharged from our state and federal institutions are unsuccessful in adjusting themselves outside as law-abiding members of the community. It seems logical to conclude that to a large extent the correctional institutions are failing in their primary task of reconstructing the behavior of the individual offender.

Such a conclusion seems all the more logical when we realize that most of the correctional institutions are still not equipped, either by their physical construction, their personnel, or their methods of treatment, to grapple effectively with the job of rehabilitation. On this point, I should like to quote a statement by Mr. Austin H. MacCormick, Assistant Director of the U. S. Bureau of Prisons,[2] an outstanding authority on educational and welfare work with prisoners. He says:

"In theory, the present tendency is toward individualization and classification and away from mass treatment. In practice, the latter is forced on most institutions by excess populations and insufficient trained personnel. In the federal institutions and those of a few states, notably Illinois, Maryland, Massachusetts, New Jersey, New York and Pennsylvania, an effort is being made to individualize treatment through diagnoses by psychiatrists, psychologists and social workers. . . . ."

"Ten prisons now have trained full-time educational directors and half that number have trained directors on a part-time basis. Educational work, however, is still at a very low ebb in prisons. In reformatories for men and women it is more extensive and generally more effective than in the prisons, but in men's reformatories it tends toward stereotyped routine and in women's institutions toward hap-

[2] MacCormick, A. H. "Prisons and Penal Conditions," American Year Book, 1930, p. 509.

hazard, indirect instruction rather than well-organized training. No prison has a real program of vocational training; this type of education is stressed in reformatories for men and women with varying success."

It must, however, be recognized that statistics of recidivism, when used for evaluating the results of correctional treatment, have serious limitations. Even if we had complete information on recidivism, this information by itself would tell us nothing as to the reasons for the failure of the offender to "go straight," or the failure of the institution to turn out a more socialized product. It thus remains possible for prison administrators to claim that their institutions are not responsible for the failure. And it must be granted that no institution can fairly be held *solely* responsible for the conduct of its products. The task of rehabilitation is clearly an impossible one, in the case of many habitual offenders. This is especially true of the large number of psychopaths, and even for mentally normal offenders whose anti-social habits are so firmly fixed that genuine rehabilitation can not be expected from any methods of treatment thus far devised.

Furthermore, even the offender who seems at the time of release, according to all available facts, to be a good parole risk, often finds it impossible to resist the forces which attract him toward old ways. So long as the community continues to tolerate crime-breeding culture areas in its midst, we need not be surprised that good resolutions made in prison dissolve after the offender is released. Like the rest of us, he tends to follow the path of least resistance.

One very important influence, which pushes many offenders toward continuing their criminal careers, is the social stigma which still attaches, not to criminality as such, but to the mere fact of having been in prison. The ex-prisoner only too often finds that most of the "respectable" people he meets are unwilling to associate with him. Many employers refuse him employment, and even his wife and relatives and his "respectable" friends often refuse to readmit him to their social groups.

Thus, various community factors may counteract all that the correctional institution or agency may have accomplished toward reclaiming the offender. Hence, if the work of the correctional agency is to be successful, it must be integrated with that of systematic and well-organized community agencies, which will supplement the process of treatment, and help the offender through the difficult period adjustment to the life outside. Furthermore, community conditions must be intensively studied and their influence considered, in connection with any effort to evaluate correctly the methods of institutional treatment.

It is evident, therefore, that mass statistics of recidivism do not distinguish between the results of institutional treatment, the effects

of community conditions and the influence of personality defects of the offender, but show only the joint outcome of all three groups of factors. And since statistics of recidivism bear more directly on the problem of evaluation than any other mass statistics, it is evident that *no* mass statistics are adequate for purposes of evaluation. Such statistics can not be applied in such a way as to measure or make allowance for the relative influence of the numerous and varied factors which are involved.

Thus we are forced to conclude that, as a basis for evaluation, intensive case data concerning individual offenders must be developed. Such data must be specific and accurately descriptive, and should be quantitative in so far as methods exist for measuring the various factors. Let us consider, therefore, what techniques are available for measuring some of the chief personality factors. Professor Frank N. Freeman, of the University of Chicago, states the situation with reference to mental testing as follows:[3]

"The success of mental testing depends largely upon the development of appropriate forms of technique. Studies in technique occupied a large share of the work during the past year. Some of these studies take the form of the construction of new statistical devices, as, for example, the conversion of scores from one scale into another, or the construction of a method of equating I. Q.'s on several tests."

"There is need for a large amount of detailed work in the invention, standardization and criticism of tests of special aptitudes. A number of tests have been reported during the past year which are designed to measure mechanical aptitudes."

(Other significant types of aptitude tests attempt to measure aptitude for scientific pursuits, and inertia.)

"Another type of test . . . . . is designed to measure character, emotion, temperament, interests and such non-intellectual characteristics. . . . . These tests deal particularly with the individual's social behavior. One test, for example, is designed to measure the behavior of the individual in situations involving rivalry and cooperation. Another one gives an index of traits of personality; another elaborates various devices for rating character; another aims to place the child on a scale of development in social behavior; another proposes a partially standardized test of social intelligence."

"A new test for measuring the emotional characteristics of the individual has appeared. . . . ."

"The logical combination of all these tests of special abilities or particularized traits is a composite test which will compare the individual's abilities or reactions in all these together. Such a test has sometimes been called a profile test. The development of the individual tests has

[3] Freeman, Frank N., article "Mental Tests," American Year Book, 1930, p. 761-4.

probably not gone far enough to warrant the construction of such a profile test but such tests have been proposed in the past and one is described in the literature of the current year."

Professor Wilbur S. Hulin of Princeton University makes this striking comment on the scientific significance of vocational aptitude tests:[4]

"The general trend of vocational aptitude tests which exhibit an increasing effort to elicit tests of significant units of response while generalized concepts . . . . are relegated to the limbo whence many of the vague generalities of the other sciences have gone. Every phase of psychology must undergo the same minute scrutiny and experimental verification required by the other exact sciences."

I should like to call attention to one technique for the testing of vocational aptitudes, which seems especially promising. It is the technique which has been developed by Mr. Johnson O'Connor, through a process of careful and exhaustive experimentation.[5] This technique has been practically applied in industry, but has not yet been applied in the study of offenders. Such application of this technique would be most desirable.

In view, however, of the largely experimental character of the types of tests which have thus far been devised for the measurement of personality facts, and the still greater difficulty of measuring methods of treatment, it would appear that no rigidly quantitative evaluation of correctional methods is now feasible. Does this mean that it is useless to attempt such evaluation? My answer to this question is "No." For I believe there still remains open a practical approach to the problem, which will amply repay any feasible expenditure of time and effort. Let us, therefore, examine in some detail the types of case data which are needed for purposes of evaluation.

The nature of this evaluation problem may be illustrated by analogy from the medical field. A tuberculosis patient who enters a sanitorium is placed in a special sort of health-promoting environment, under a specific routine, which regulates all the principal features of his daily life, including the amount and kind of food, rest, exercise and recreation, clothing, and daily exposure to fresh air and sunlight. It is to be noted that, to a large extent, the effects of treatment can here be measured objectively by recording the patient's gain in weight, improved appearance, reduction to normal temperature, pulse-rate, and internal condition. Likewise, the specific features of the treatment can be recorded in a definite way.

Now, when an offender is committed to a correctional institution, or is placed on parole or probation, and the agency in charge attempts to

[4] Hulin, Prof. Wilbur S., in article, "Psychology," American Year Book, 1930, p. 746-752.

[5] See O'Connor, Johnson, article in Atlantic Monthly, June, 1931, entitled "Taking a Man's Measure."

measure the results of treatment, it is confronted with a problem similar to that of the tubercular hospital. Both in the case of the tubercular patient, and that of the offender, the factors which must be considered may be grouped under three main heads: (1) Facts concerning the person treated; (2) Facts concerning the treatment applied; (3) Facts concerning the conditions surrounding the person after formal treatment is terminated. It can readily be shown that under each of these headings, the number of factors and the difficulty of measurement are greater for the offender than for the hospital patient, and therefore the problem of measuring results is more complex for the correctional agency.

Let us consider, for example, the first group of factors, those concerning the individual offender and patient. During the past 10 years, there have been a number of experimental studies of the relationship between various facts concerning paroled offenders and their success or failure on parole. Dr. C. E. Gehlke, in a recent analysis of eight such studies,[6] finds that 149 different delinquency factors have been considered by various investigators. In the most exhaustive of these studies, that of the Gluecks, 58 distinct factors were treated statistically.

It is to be hoped that further research will make it possible to select a comparatively small number of factors which are especially significant. None the less, it is probable that the highly significant factors thus isolated will still outnumber the facts concerning the tubercular patient which are significantly related to the results of the treatment applied to him. The problem of the offender is inherently more complex, since his social rehabilitation depends upon improving not only his physical condition, but also his mental condition, and especially his behavior. It may be granted that the tubercular patient's mental attitude and his behavior play a part in the process of treatment. But it remains true that the improvement of his physical condition is the basic problem, and that other factors are incidental, whereas these less tangible factors are of chief importance in correctional treatment.

Not only are the personal factors associated with delinquency more numerous and varied than those connected with physical disease, but these factors are typically more difficult to ascertain and to measure. For example, in the case of the tuberculosis patient, the principal facts, such as weight in relation to age and height, pulse, temperature, and specific pathological symptoms, can be measured or otherwise determined easily and accurately. In the case of the offender, the principal facts which are needed in the first instance for purposes of diagnosis and for determining the most appropriate treatment, are needed later for judging the results of the treatment. But in the present state of

[6] Gehlke, C. E., "Testing the Work of the Prison." in The Annals of the American Academy of Political and Social Science, September, 1931.

science, such facts as social attitude, vocational aptitude, and habits of behavior are hard, if not impossible, to measure. Yet we have seen that they must be measured if we are ever to secure a truly scientific basis for treatment, or for evaluating the results of treatment.

Let us follow our analogy further, and consider the problem of describing specifically, for purposes of evaluation, the conditions and methods of treatment. In the tuberculosis hospital, the chief features of the physical environment can be objectively described. This can also be done for the correctional institution. But when we come to the offender who is on parole or probation, it is immediately evident that no such precise description of his environment is possible. At most, we can here arrive at nothing more than an approximate description of a few outstanding features, such as the type of home, type of neighborhood, nature of employment, and types of recreation. The measurement of such items is obviously impracticable. Furthermore, the precise description of methods of treatment presents far greater difficulty for offenders than for hospital patients, wherever the treatment is devised on modern lines, and is to any extent individualized. But here, again, the problem must be solved, before we can hope to make an accurate evaluation of results.

The third principal phase of the problem of evaluation relates to the environment of the subject after formal treatment is terminated—that is, after the patient or the prisoner is discharged, or after parole or probation supervision has been terminated. Here, also, in the analogous case of the discharged hospital patient, the problem of securing adequate evaluation data is somewhat easier than in the case of the offender. In both cases, however, there are serious obstacles to be surmounted. In fact, the only data which are ordinarily available relate to those cases in which a relapse occurs, and the subject is returned for further treatment. In the case of the correctional agency the subject who "relapses" into crime is sent more often than not to a different institution, both because his new conviction occurs in a different jurisdiction and because the reformatory "graduate" is likely to be sent to a penitentiary on his next conviction.

The key to the solution of the problem lies, I believe, in the development of progress records for individual offenders. These records should link together specific personality facts with the corresponding facts concerning the treatment applied and the responses to treatment. So far as feasible, such progress records should be extended, by follow-up studies, to cover the status and environment of offenders at suitable intervals after the formal process of treatment has been terminated. Just as individualized treatment of the offender is coming to be recognized as the only scientific process of treatment, so individual case study must be accepted as the only sound basis for evaluation of treatment methods.

A tabular analysis of evaluation factors is herewith submitted, covering a number of the principal groups of facts. Time does not permit a detailed presentation of this table. But a few examples may perhaps be mentioned. Let us consider, for instance, the educational status of the offender. Under the proposed scheme, this status would be studied when he is first received. His school record would be verified by correspondence, and supplemented, when advisable, by a thorough-going examination in basic subjects, and by psychological tests of his capacity.

The offender's education, we will suppose, is found to be lacking in specific ways, and a course is mapped out for him. During his stay in the institution, his educational advancement is tested at intervals, and a final test is given just before release. He is then advised as to further needs for education. The results of all these tests are entered on his progress record, and are available to all institutional officials and especially for considering his qualifications for parole. His post-treatment record should aim to show how far he has carried out plans for further education.

Another example is the work history, which is obtained at the time of receipt, verified by correspondence, and supplemented by vocational aptitude tests. The offender's work assignment is planned accordingly. Then his progress in acquiring specific skills is measured at intervals by performance tests, and the results entered on his progress record. Upon release, a final test would be given, and his total progress in relation to his aptitude would be thus evaluated. After release, his work history would be continued for a prescribed period.

The question may well be raised at this point whether it is feasible to secure such intensive case histories, progress records, and follow-up data, for all the huge mass of offenders who pour, in an ever-growing stream, into our institutions, and into the care of our parole and probation agencies. On this point, I fully agree with Professor E. H. Sutherland, who has convincingly shown that such an ideal program is impossible for the present, both because the required funds are lacking, and because the necessary expert personnel is not available. Further testimony on this matter, with reference to the availability of adequately trained psychiatrists, is given by Dr. George K. Pratt, of the National Committee for Mental Hygiene. He says.[7]

"The personnel situation in the professional field of mental hygiene remains as acute as ever. Despite the awarding of nearly a score of fellowships for training in extramural psychiatry . . . . a number of important clinic projects must be held in abeyance until adequately trained personnel is available."

There is an even greater lack of sociologists and social workers who are equipped to undertake the scientific study of offenders, and to do

[7] Pratt, Dr. Geo. K., article, "Mental Hygiene," American Year Book, 1930, p. 523.

TABULAR ANALYSIS OF EVALUATION FACTORS

Personal Facts			*Treatment Facts*		*Types*	*Post-*
Before Treatment	*During Treatment*	*After Treatment*	*Facilities Used*	*Methods Applied*	*of Personnel*	*Treatment Conditions*
Physical:						
Defects	Corrections effected	Stability of correction	Medical equipment	Medical treatment	Medical	Physical environment
Diseases	Results of treatment	Stability of cure	Same	Same	Same	Same
Capacities	Development of capacities	Stability of gains	Recreational	Physical training	Recreational	Physical activities
Mental:						
Capacity	Capacity	Capacity	Special tests equipment	Mental tests	Psychologist	.....
Educational Equipment	Educational achievement	Educational status	Specific courses	Instruction methods	Teacher	.....
Handicaps	Improvement	Status	Psychiatric	Psychiatric techniques	Psychiatrist	.....
Vocational:						
Types of work	Types of work	Types of work	Work facilities	Work assignments	Work instructor	Working conditions
Capacity	Skills acquired	Vocational adjustment	Special test equipment	Aptitude tests	Psychologist or work instructor	Same
Behavioristic:						
Conduct	Conduct	Conduct	.....	Disciplinary training	Disciplinary officer	Conditions influencing conduct, etc.
Family history	Family adjustment	Family status	Social agencies	Interviews and correspondence	Social worker or sociologist	Same
Group association	Group assignment	Group association	Classification	Classification	Same	Same
Recreational history	Recreational changes	Recreational habits	Recreational facilities	Recreational activities	Recreation director	Places of recreation

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adequate case work with them. It is clearly necessary, therefore, that the intensive study and treatment of offenders, and also the evaluation of results, should be limited, at least for the present, to selected groups of offenders. In selecting the cases for intensive work, it is important that a biased selection be avoided. It would be unfortunate, for example, if only known recidivists were selected, and equally unfortunate, if recidivists, or habitual offenders, or some other special group, were excluded.

At the same time, from the administrative standpoint, it would seem to be desirable for only the more hopeful cases to be chosen for intensive treatment, in order that the treatment facilities may be utilized as effectively as possible. Perhaps a feasible compromise policy of selection would be to include, so far as possible, all of the fairly hopeful types of cases. To these should be added a small sample of those types of offenders whom it is desirable to study, but on whom efforts at treatment seem likely to be largely wasted.

FUTURE POPULATION AND BUSINESS PLANNING

(Discussion) by ELMER C. BRATT

A statistical analysis of the effect of population growth on the growth of given industries is apt to proceed from a study of data on the analogous situation—a comparison between the outlays for these goods in stationary communities and outlays in growing communities, or at least between sets of communities growing at different rates. Carefully handled this should provide a statistical basis for the problem. It must be borne in mind, however, that the analogy is not perfect, and if the lack of coincidence is disregarded, the errors will not be self-compensating.

The following describes briefly one of the underlying differences in the analogy which clouds the comparison. The stationary community may probably estimate a decadent future due to such factors as the exodus of industry, and hence use up provisions such as buildings without making adequate replacement. On the other hand, the growing community may tend to anticipate a bright future in the provisions actually effected. Hence by subtracting the provisions made in stationary from those made in growing communities, we will include not only a provision for the growth in population which actually took place, but also a difference in provisions for anticipated growths. Although the provision made for the total population in any given period must be dependent upon the anticipated growth of population in the future, the anticipation of one period and another have no necessary equivalence to the anticipations of stationary and growing communities. In the latter case there is an offset, a growth of some communities at the expense of others. There appears to be nothing similar as between different periods.

Another underlying difference exists in the case of production capacity per capita. It appears probable that the production capacity per capita in a majority of our industries will make a substantial increase in the present decade if the anticipated lower population growth should materialize. This is a problem involving other factors such as changes in productivity and changes in demand for leisure as has been shown this morning. It is evident that the difference in production capacity per capita which exists between stationary and growing communities over the same time interval involves a different set of variables.

These illustrative ways in which the analogy of stationary and growing communities fail, do not demonstrate the statistical impossibility of estimating the effect of population growth. For instance, the effect of changing population composition and distribution has been shown to be measureable in the morning's papers.

All of these differences seem to illustrate the necessity of detailed studies. Probably all of requisite measurements can be made, more or less approximately, if we are willing to obtain and examine the necessary detailed data. Such a difficult problem as the effect on production capacity per capita, involving measurements for which there is no adequate data, is nevertheless a very tangible problem.

Detailed analysis is particularly desirable in studying the effect of population growth on the growth of production goods industries. Consumption of steel per person, for instance, has only an indirect meaning. The effect of population growth is more indirect in an industry where goods are not made for direct consumption and where the depreciation period runs from 10 to 20 years. On the other hand, insofar as there is no pronounced shift from the use of one type of producers' goods to another, the effect of population growth should be more evident here, because producers' goods will be made in proportion to the total use of goods, being little affected by fickle demand of the type which makes the demand for consumers' goods shifting and uncertain. To say this another way, the competition of substitutes acts differently in the case of producers' goods.

One can caution therefore against naive acceptance of broad comparisons, and indicate the necessity of detailed studies in order to obtain a clear basis for anticipation.

If there is any disagreement between Mr. Holden and myself, certainly it is not clearly defined. I would emphasize the type of factors Mr. Holden considered in the last half of his paper. My meaning is to warn against epigonen who copy the broad comparison but omit what to my way of thinking is more important, these detailed factors of difference. To emphasize this is, I believe, to take a more rather than less, optimistic view of the possibilities of statistical analysis of the problem, if considered together with a careful analytical study.

PROBABILITY OF DIVORCE[1]

By ALFRED CAHEN

In the banner year 1929, 201,468 divorces were granted in the United States, or about one every two minutes. During the economic depression of 1930, this record number was reduced by almost 10,000 cases.

What is the present probability of divorce among all American marriages? Exact data are not available on all the factors, so that some statistical manipulation is required to derive an estimate. However, it is believed that a bold attempt, cautiously enacted, should have more scientific value than the usual haphazard guessing on this subject.

Three methods are employed for computing the probability of an average marriage ending in divorce.[2] The first is popularly used in comparing the number of divorces annually with the number of marriages. This is erroneous because no logical relationship exists between the two. Very few people are divorced the same year they are married; in fact, the median average lag between marriage and divorce among those marriages eventually destined to end in divorce is about seven years. Consequently, a ratio between marriages and divorces of the same year underestimates the chances of divorce.

Another method of calculating the chances of divorce is a comparison of the number of divorces annually with the number of deaths of married persons, since all marriages are eventually broken by one or the other. This is likewise erroneous, for again there is no logical relationship between the two. Since the people who are being divorced at the present time are much younger than the majority of those who are dying, this method is actually comparing current divorces with deaths of several years ago if the age factor were held constant, and consequently overestimates the chances of divorce.

A correct method for estimating the probability of divorce requires more refined computations. One must follow the course of marriages contracted, and ascertain what proportion of the total ends in divorce for each year of married life. Chart 1 is a frequency curve listing the relative percentages of divorce granted in 1928 by given years of dura-

1 This paper is a section of a doctoral dissertation entitled, *Statistical Analysis of American Divorce* published March, 1932, by the Columbia Studies in History, Economics and Public Law, which was written under the guidance of Professor Robert E. Chaddock of Columbia University.

2 Willcox, Walter F., "Statistics of Marriage and Divorce in the United States," *International Statistical Institute*, Paris, 1909, pp. 1-15.

tion of marriage for the first thirty years of married life.[1] Only about 2 per cent of the divorces occur after the thirtieth year of marriage. About half of the divorces occur during the first seven years. Inspection of the graph shows that the mode, which is the year of marriage with the highest number of divorces, falls during the third year of married life. There is a rapid rise in divorces virtually from the wedding day until the third year of marriage, and then commences a slow and steady decline in divorce frequency. The abnormally low percentage of divorce in the sixth year was merely due to an excessive number of marriages in 1922, the year following a business depression.

The *U. S. Marriage and Divorce Report* for 1928 also distributes the total number of divorces by years of marriage, such as 1928, 1915, 1899 or any other year. If the number of divorces in each of these annual intervals is divided into the number of marriages for each of these years respectively, one finds the yearly percentages of marriages that end in divorce. Thus a new frequency table is constructed for the probability of divorce in each year of married life. Of 10,000 couples 1,792 would eventually end in divorce, or about 18 per cent, according to the 1928 rate of divorce in the United States. This final figure was obtained by adding the percentages of divorces occurring for each of the first thirty years of marriage. This was corrected for certain minor factors. The divorces occurring after the thirtieth year of marriage were based upon the thirty-fifth year and a percentage calculated. Since over 4,000 marriages were annulled in 1928 these were based upon the second year, the median for annulment, and a percentage likewise calculated. Finally a miscellaneous class of divorces totaling 11,000 was recorded but without knowledge of the year in which marriage took place, and to this number were added about 500 estimated divorces to Americans given by foreign decrees. From this sub-total were subtracted about 6,000 divorces, as a recent government divorce report has shown that about this percentage of divorces is annually granted to persons living in the United States who had been married in foreign countries. The miscellaneous figure remaining was based at the seventh year of marriage, the median for divorce, and a percentage likewise calculated. All the percentage estimates for the thirty years of married life plus all the corrections for minor factors were totaled; giving the summation frequently of 17.92, or about 18 per cent, which is the probability of an American marriage ending in divorce for the year 1928.

Chart 2 presents this data in a frequency curve for the probabilities of marriage being ended by divorce for each year of duration of married life. The first year shows that 70 couples in every 10,000 will resort to the divorce courts. The second year lists 120, or 1.2 per

[1] *U. S. Marriage and Divorce Report*, 1928, Washington, 1930, Tables 22 and 29.

cent. The third and fourth years are modal, each having 1.32 per cent as broken by divorce. The abnormally high frequency for the eleventh year is due to war marriages, even a decade later. The thirtieth year of marriage lists only .10 per cent. This graph is more accurate than the previous frequency curve because it takes account of the increasing number of marriages in recent years. Since the number of marriages in this country has been rising for many years, divorces occurring during the early years of married life would be more frequent for that reason. Chart 2 eliminates this biasing factor, and consequently is less skewed toward the later years of married life. Although it is true that the majority of divorces take place during the early years of married life, unrefined figures are likely to exaggerate this idea. The previous chart is based entirely on the unmodified percentages given in the government divorce report. The mode there was in the third year of marriage. After the data have been refined to account for the increasing number of marriages within recent years and therefore a larger number of married people who could potentially be divorced, the modal year then passes to a position exactly placed between the third and fourth years. Another reason to be considered for more divorces occurring in early married life is because a greater percentage of the spouses are still alive to be divorced, while in later years death has taken an increasingly large toll with consequently a fewer number left for the divorce courts. The dotted line for Chart 2 shows a calculated death rate per hundred married population during each year of wedded life.

This refinement was obtained by assuming that the majority of persons eventually to be married have wedded by their twenty-fourth year of life, as given in the decennial census figures for 1920.[1] The death rates for each year of age were applied after the twenty-fourth year.[2] These yearly death rates are doubled to allow for marital rather than individual death rates, since the death of either spouse would dissolve a marriage. The derived figures are shown by the dotted line in Chart 2, which is a rough estimate of the probabilities of dissolution by death for each year of married life. Thus during the first five years of marriage divorce outranks death as a breaker of the American home. After that death steadily increases while divorce speedily declines during the later years of married life.

A new table of the probabilities of divorce by years of duration of marriage was constructed on the basis of this refined data which take into account both the marriage rate and the death rate. The purpose is to ascertain the probabilities of divorce by years of marriage after corrections have been made for the increasing number of deaths during the later years of married life. The resulting frequency curve, Chart 3,

1 *U. S. Census*, 1920, vol. ii, pp. 391-392.
2 *U. S. Life Tables*, 1910, Washington, 1921, p. 54.

is much less skewed than its two predecessors. The mode has now passed definitely to the fourth year of marriage, and the chance of divorce in the thirtieth year of marriage is twice as high as that shown in the previous frequency curve. This chart takes account of the fact that less couples are still alive in the later years of married life, with the possibilities of divorce to face them.

The shortness of married life in the divorced family contrasted to the unbroken home is particularly marked. The median average length of time between marriage and divorce is about seven years. What is the duration of the ordinary American marriage? A crude estimate of this can be computed by striking an average for the number of American marriages for three years centered at 1928. If one then divides the total number of married couples living in the United States by the total marriages for the same year, this gives a rough approximation of the length of American marriages, specifically, 20.4 years till death or divorce shall part.

Since 18 per cent of the marriages end in divorce at an average of 7 years' duration, these reduce the length of married life 13.4 years times 18 per cent, or 2.4 years. Addition of this latter figure to the average length of marriage (20.4 years) tells that about 23 years would be the length of an American marriage till death removes either spouse, if divorce were eliminated. In Chart 4 three bars picture the average duration in years of American marriages—till death shall part, till divorce will rend asunder, or till the hypothetically happy home is dissolved by either fatality.

A significant aspect of divorce probability concerns the inverse relationship between the size of the family and the occurrence of divorce. Chart 5 shows in the large circle diagram, the respective percentages of divorced families according to the number of children affected. The distribution for 1928 is listed in the centre of the graph. Thus childless homes are the source of almost two-thirds of the divorces. An additional 20 per cent of divorces, or a majority of the remainder, come from one-child marriages. Expressing this relation in more definite form, one notes that as children increase arithmetically divorce correspondingly decreases at a geometrical rate; in other words, the more children the less divorce.

Dr. Alfred J. Lotka, of the Metropolitan Life Insurance Company, has estimated by refined mathematical calculations that about 17 per cent of American marriages are sterile.[1] This figure is here employed for the purpose of discovering the relative probabilities of divorce according to the presence or absence of children, as shown in the circle diagram in Chart 6. As previously stated, the average American married couple faces an 18 per cent fatality in the divorce court. Simple

[1] Lotka, "Sterility in American Marriage," *Proceedings of the National Academy of Sciences*, January, 1928, pp. 99-109.

arithmetic computations show that 71 per cent of childless marriages in America end in divorce, while only 8 per cent of married couples with children eventually are divorced.[2]

To recapitulate, the probability of divorce among all American marriages is approximately 18 per cent, and divorce prevails in the earlier years of married life. The modal year is the fourth, and the majority of divorces occur during the first seven years of marriage. Divorce is not a normal American family habit, because over two-thirds of American divorces are recruited from that comparatively small group, the childless marriages. Only 8 per cent of married couples possessing one or more children terminate in divorce, and every additional child in the home cuts in half the probability of divorce.

2 Sixty-three per cent of the divorces come from about one-sixth or 17 per cent of the marriages, the sterile ones. If all marriages were sterile, the probability of divorce would be 63 per cent of the present divorce rate multiplied by six.

PROBLEMS IN DETERMINING THE EXTENT OF BLINDNESS

By EVELYN C. MCKAY

Work for the blind in the United States has just celebrated its hundredth anniversary and at present there are more than a hundred well-established state and voluntary agencies for the blind in this country. Yet in spite of general recognition of the importance of blindness, no one can say with any degree of certainty what is the extent of blindness. The purpose of this paper is to point out some of the reasons why this is so, and to indicate briefly some of the measures which are being taken to solve the problems involved.

Since 1830, the Federal Bureau of the Census has included in its decennial enumeration a census of the blind. These enumerations formed an essential basis for the establishment of agencies for the blind in various states and cities, and particularly for securing of state funds to carry on such activities.

But as these agencies increased in number, and particularly as greater efforts were made to reach the blind in their homes instead of concentrating on those who came to the institutions, it became apparent that the Census figures, useful as they were for certain purposes, were not complete. This incompleteness of enumeration was recognized by the Census authorities themselves and they estimated that while only 52,567 blind persons were reported in the 1920 census, the total was probably 75,000. Various workers for the blind estimated that the total number was possibly 100,000.

Nor was the incompleteness of the count the only fault in the data. It was impossible to determine whether the blind persons reported in the census were representative of the blind population as a whole. It was conceivable that the blind in urban areas might have been more easily located than the blind in isolated districts, or that the young blind attending special schools were more completely reported than the adult blind living in their homes, etc.

These defects in the data were due to two factors: First, certain problems inherent in the condition of blindness itself; and second, to problems inherent in periodic enumeration as a method.

In the first place, "blindness" is a vague term and includes many degrees of visual defect. The definition of blindness used in the 1920 census was "inability to read even with the aid of glasses." While this is satisfactory for general purposes, it is liable to variation in application at the hands of enumerators. Moreover, certain eye defects are of such a nature as to render the individual unable to carry on an

occupation for which eyesight is essential, even though he may retain enough vision to read.

Another difficulty is that many persons are unwilling to admit that there is blindness in the family and therefore do not report it.

The most important reason for the incomplete reporting, however, probably lies in the comparative rarity of blindness. The highest estimates so far arrived at would seem to indicate that the incidence of blindness in the United States is not more than one per thousand, and since the enumerator encounters a case so infrequently, he is likely to give up inquiring for it.

The various agencies for the blind, particularly those supported by State funds, have sought to secure more adequate figures by establishing so-called "registers of the blind," on which the names and addresses of all blind persons known to live within the given area are recorded, together with certain important facts regarding them. These registers have certain advantages over the Census enumeration in that:

1. The agency for the blind has definite services to offer, and therefore there is an incentive for the blind person to report his blindness.
2. The enumeration extends over a longer period of time and in many states is a more or less continuous activity.
3. The enumeration or registration is done by persons whose chief interest is the blind, and who are more or less familiar with the conditions of blindness.

Investigation, however, shows certain serious defects in the existing registers, namely:

1. The registration is done by persons who are for the most part unacquainted with statistical methods.
2. In all too many cases, the registration is based on the judgment of the field agent or on the report of the blind person, and not on actual tests of vision.
3. The agency for the blind is primarily concerned with rendering service and consequently blind persons who are not in need of its service are likely to be overlooked.
4. There is in most states no adequate machinery for keeping the register up to date.

Even if we were prepared to say that, in spite of these weaknesses, the existing registers in individual states were sufficiently complete and accurate to make analysis of the data valuable, a comparison of the registers of various states shows that there is little uniformity in their definitions of blindness, in their methods of registration, or in the classifications they use in analyzing the data collected. It is therefore impossible to make comparisons between one state and another or to

compile from these registers any accurate figures on blindness in the United States as a whole.

These are some of the reasons why no accurate statistics on the extent of blindness are available. Workers for the blind and others interested in social problems have long felt the need of more adequate data on the subject, and in 1929 the American Foundation for the Blind, a national organization for research in problems of blindness, and the National Society for the Prevention of Blindness, a national organization for preventive work, united in calling an informal conference to consider the matter of better statistics of blindness. Those attending the conference included statisticians, representatives of the medical profession, workers for the blind, and social workers from other fields. Following this conference, a working committee (which later became known as the Committee on Statistics of the Blind) was formed for further consideration of the problem. The second part of this paper, which will deal with some of the measures that are being tried in an effort to develop better statistics of blindness, will be based largely on the work of the Committee during the past two years.

The problem of the extent of blindness can be resolved into two questions: What is blindness? and, How can the blind be enumerated?

First, as to What is blindness? The definition employed in the 1920 census has already been mentioned—"inability to read even with the aid of glasses." As has also been already indicated, workers for the blind felt that this did not entirely fit their needs since some of the persons under their care were for vocational purposes blind, yet retained enough vision to pass the reading test. Physicians, on the other hand, were accustomed to refer to blindness in terms of the amount of vision remaining, as shown by their measurement charts, and employed varying terminologies in recording their findings.

In 1927, two professional organizations in work for the blind, namely, the American Association of Workers for the Blind and the American Association of Instructors of the Blind appointed a joint committee to draw up a definition of blindness which would be acceptable to educators, ophthalmologists, and workers for the blind. The report presented offered three definitions acceptable respectively to each of the three groups named. Excellent as these definitions were, they were somewhat unsatisfactory for statistical purposes.

One of the first tasks of the Committee on Statistics, therefore, was to develop some statistical basis for classifying persons as "blind" or "not blind." It was felt that no single definition was likely to meet with the approval of all groups concerned, but that some subdivision of the whole range of blindness might be effected so that the data of one agency might be compared with those of another. It was also necessary to develop some means by which the reports of the ophthal-

mologists, who were likely to use different terminology and different systems of measurement, could be expressed in common terms.

The Committee has worked out a table for this purpose. The first step was to divide the blind into groups according to "amount of vision remaining," selecting groupings which, according to experienced workers for the blind, had significance in determining the vocational possibilities of blind persons. The upper and lower limits of these groups were then expressed in terms of Snellen measurements of vision, the system of vision-testing which is in general use in this country. The groups selected were:

1. Totally blind or having "light perception" only (0 to 2/200)*
2. Having "motion perception" and "form perception" (2/200 to 5/200)
3. Having "traveling sight" (5/200 to 10/200)
4. Able to read large headlines (10/200 to 20/200)
5. "Borderline" cases (20/200 or more but not sufficient for use in an activity for which eyesight is essential).

Since it is not always possible to arrange for a blind person to have an eye examination, a set of tests for the use of lay workers was added, these tests corresponding as nearly as possible to the groupings already set up.

This chart has been worked out with the help of several ophthalmologists and workers for the blind and has already been tried out on several groups of records with satisfactory results, but it is still subject to modification by the various professional organizations to whom it is to be formally submitted. Such a chart will make it possible to compare the registers of the blind in different states which have hitherto been incomparable because of varying definitions of blindness.

As to the other question. How can the blind be enumerated? Some of the difficulties involved in locating all the blind people in a given area have already been mentioned, and it has been pointed out that the existing registers of the blind are probably somewhat inaccurate.

One of the members of the Committee suggested that it would be desirable to make intensive surveys in certain limited areas, to determine the degree of completeness of the existing registers, and a member of the Committee who is head of the state work for the blind in Connecticut, volunteered to make the first studies. It was agreed that as many groups in the community as possible should be reached in an effort to tap every available source from which names of blind individuals might be reported. Records were kept of the returns from each group so that the study served also as a test of the comparative efficacy of the various case-finding methods.

* Snellen measurements of visual acuity.

Two areas, one rural and one urban, were selected for the study, each with a population somewhat over 100,000 according to the 1930 census.

The various methods used for securing new names were as follows:

1. Letters to blind persons already on the register requesting them to report names and addresses of all blind persons they knew of. (These letters also served as a check on the accuracy of the existing registration).
2. Similar requests to users of electricity in the selected areas, these requests being enclosed in the monthly statements sent out by the company. Over 75,000 patrons were reached in this way.
3. Requests to physicians.
4. Requests to clergymen.

It was felt by the Committee that the schools might have been another fruitful source, but since for administrative reasons it was necessary to make the study during the summer months, the schools had to be omitted.

The returns were carefully checked against the existing register and against each other and all duplicates eliminated. Each blind person reported was then visited by an experienced field agent and certain data were secured. This visiting led to further eliminations of names.

It was found that 771 names were reported from various sources. Of these, 512 or about 66 per cent came from the electric service patrons. When it is remembered, however, that more than 75,000 patrons were solicited, and that these returns represent less than eight-tenths of one per cent of the total, it becomes apparent that this method is not economical of labor.

The next most fruitful source was the blind already registered—these reported 79 names. Physicians reported 31 and clergymen 27.

To test the completeness of the survey, a re-canvass of certain towns was made, and 11 new names were added to the list; 112 names had already been reported from these areas so that the results of the re-canvass represent an increase of 10 per cent. Because of certain factors in the re-canvass, this cannot be taken as a representative figure, but it suggests that even the extensive methods used were somewhat inadequate.

Of the 782 names reported, 621 were discarded as being "not blind," blind in one eye only, duplicates, "not located," or living out of district.

This left 161 names, or about 21 per cent to be added to the register.

Of the 372 names on the register at the close of the survey, 211 had been on the register at the beginning. This gave a rate of .915 per 1,000 of the general population. Since the highest estimates made suggested 1 per 1,000 as the probable incidence of blindness, it might have been supposed that the original register was more than 90 per cent complete.

Nevertheless, when the 161 new names were added to the register, making a total of 372 names, it became apparent that the original register had been only 57 per cent complete. In justice to the Connecticut organization it must be added that the definition of blindness used in the study was somewhat more liberal than the one formerly in use, and this accounts for part of the increase in names. But even if the more restricted definition is used and the "borderline" cases (which numbered 85) are omitted, the original register is found to be only 79 per cent complete.

Unfortunately, no record was kept of cases on the original register which during the survey were found to be obsolete (that is, dead, moved out of the area, or regained sight). That there were some such is known and this indicates a further inaccuracy in the original register.

The conclusions drawn from this study were as follows:

1. That existing registers of the blind are probably not complete or up to date.
2. That there is need for further trial and evaluation of case-finding methods.
3. That there is need for the development of better methods of current registration and of eliminating "dead records."

The Committee hopes to follow the Connecticut study by studies in selected areas in other states, with the two-fold purpose of testing the completeness of the registers and of testing and of evaluating case-finding methods by which registers may be improved. There still remain, however, other problems to be solved before adequate statistics will be available. This report is a report on problem and method rather than a report of accomplishment.

INSANITY DISTRIBUTION BY LOCAL AREAS

By ROBERT E. L. FARIS

A series of studies has indicated that the physical pattern of Chicago, as well as of many other cities, is determined at least partly by an unplanned process based on competition. This ecological process sorts and distributes the elements of the population, locates various institutions and functions in such a manner that a typical pattern is formed and maintained, without the consciousness or planning of human beings. Through this interplay of impersonal forces certain "natural areas" are formed, which tend to retain their location and characteristics not only without being planned by men, but to a certain extent in spite of these plans. The characteristics of these natural areas are not entirely the result of the nature of the groups that inhabit them. Actually there appear to be certain characteristics which are developed in the inhabitants of these areas which were not previously found among them, and which tend to disappear when the groups move out of the areas. Clifford R. Shaw has shown that juvenile delinquency seems to depend on the area more than on racial origin, personality type, or family solidarity. Something in the conditions in the disorganized areas gives rise to the type of behavior we call delinquency.

We have other evidence that the natural areas formed by this ecological process have an effect on human behavior. Studies of rooming-house areas by Zorbaugh, vice areas by Reckless, dance halls by Cressey, suicide by Cavan, etc., point out certain of these effects. Similarly, other studies have indicated that there is also a reflection of this process in the organization and functioning of various institutions, such as the family, the church, and political and economic institutions.

This study of insanity indicates that a similar conclusion might be found with regard to mental processes. Although the word insanity is used to describe rather different phenomena, there are some forms which seem to be related in some way to the ecological processes. The workings of our minds, then, can be said to be determined partly by the characteristics of the natural areas in which we live. Just as the rates of juvenile delinquency persist in certain areas in spite of migrations of different racial and national groups, so it appears that certain typical forms of mental abnormality occur much more frequently in certain areas, regardless of the particular racial or national group occupying the area.

A number of maps were prepared to indicate the areas of high insanity rates. Most of the material used was gathered from the

records of the Chicago Psychopathic Hospital; the hospital which examines all patients from Chicago who enter any of the three state hospitals for the insane. This includes then all of the cases in the city cared for in public hospitals. A special examination of the cases from a private hospital was also made.

From the records of the Psychopathic Hospital the addresses and diagnoses of all the patients received in 1920 and 1930 were copied. Earlier records were not available. Included were all cases except drug addicts, undiagnosed patients, those diagnosed as not insane, and those whose residences were not in the city.

Because the population is more dense in certain sections of the city, a spot map would show some concentration merely because of this fact of density. Therefore it was considered advisable to compute rates for local areas. The areas used were, except in one case, the 75 local communities as worked out by the Local Community Research Committee. The addresses of the patients were sorted into these local communities as worked out by the Local Community Research Com- by the population of the area, thus giving the rate. The first map was prepared using the 3,205 cases of the year 1930. When the rates for each community were computed, they ranged from 19 to 825 (per 100,000). When these rates were indicated on a map of the city, the clustering of the areas of high rates around the center of the city was very noticeable. The highest rate was in the business district itself. The next highest rates were found in the adjacent areas. The lowest were found on the edges of the city. In general the picture presented to the eye was an even shading from the center outward, with lower insanity rates farther from the center. The chief exception to this was a slight rise in the rates near the industrial district around Lake Calumet, near the southern edge of the city. In other respects beside high insanity rates, this region resembles those near the center of the city.

It was considered desirable to check this distribution with others for earlier years. Unfortunately records before 1920 were not available, but the 1920 data gave practically the same result.

A possible interpretation of this concentration near the center of the city was that the distribution of rates was due to the differences in age distribution. Insanity is comparatively rare among children and this fact might affect the distribution of rates. The check was made by dividing the 1920 cases by the adult population in each area, instead of the total population. The same concentration at and near the center was shown, however.

Let us examine for a moment these areas in which the insanity rates are high. The central business district has the highest rate. There are, however, no actual residences in the central business district, but a number of records gave addresses within that area. An examination of these cases shows that most of them came from the cheap lodging-

houses on the streets inhabited by bums and hoboes. This high rate, then, represents not so much a rate for the central business district as a hobohemia rate. The communities surrounding the business district also have high rates. These are the communities in which are found the most recent arrivals to the city. Here are the hobohemias, the slums, the rooming-house areas, the immigrant areas. Here is where other studies have found the greatest disorganization. These are the communities that over-subscribe their quota of insane patients.

Is it necessary to assume, however, that it is the area which is responsible for the high rate? Other possibilities suggest themselves. Might not this insanity be a trait of the races that happen to occupy these areas? Might not these people be inferior by heredity? Or might it not be the case that insanity is in fact evenly distributed over the city, but only those in the poverty-stricken areas are willing to send the members of their families, and their friends to a charity hospital?

In the absence of better opportunities, it was necessary to use whatever checks could be found on these questions. We have no reason to believe that hereditary inferiority should be concentrated in one section of a city, but it is not necessary to stop with that assertion. We can sort out from the other cases, those patients diagnosed as having Huntington's Chorea, and Epilepsy, two types of insanity which are more often agreed to be hereditary. This was done, and the cases showed no concentration at all. The scatter was city-wide.

The fact that some races are spread out over rather large areas, presents an opportunity to find out to what extent this concentration is due to racial characteristics. The Negroes in Chicago, for instance, are located in a belt which extends for several miles, the inner end of which is close to the center of the city, in a region of the very greatest disorganization. The other end extends out to a rather high-class residential area. All gradations between the two areas are represented in the belt, between the two ends. Local communities numbers 33, 35, and 38 are in this row. Number 33 is the northernmost, directly adjacent to the business district. Numbers 35 and 38 are in a column south of 33. In each of these communities the population is practically one hundred per cent Negro. Their rates of insanity are, in order from north to south, from the most disorganized area to less disorganized areas—288, 233, 132. Even in the one race, this relationship of the insanity rates to the areas is noticeable.

A similar check was made with reference to the Jewish group. The Jews in Chicago do not live in adjacent areas, as do the Negroes; nor do they occupy entire local communities. It was necessary in this experiment to get an estimate of the Jewish population in each area used. In six areas it was possible to get a more accurate estimate of the Jewish population than the census data afford, and so by dividing the number of Jewish cases in each area by the estimated Jewish pop-

ulation, a Jewish insanity rate was obtained for these areas. These six areas are not in a column. Four of them form a square in a very highly disorganized section of the city. The other two are located far out from the center, in residential districts, one on the North Side, the other on the South Side. The four communities in the disorganized sections had Jewish rates of 70, 59, 53, 39. The other two had rates of 30 and 24. Again, the same group in different areas had different rates, and these rates were lower at greater distances from the disorganized sections.

The suggestion has been made that since the cases represented in these distributions are taken from a public hospital, they represent only the cases that appeal to charity, and are thus a selection more on the basis of poverty than anything else. It was thought that a distribution of the cases from private hospitals would yield a different result. The private hospital was assumed to select patients of upper economic classes; the public hospital from the lower economic classes.

An examination of all the private hospitals that have insane patients from Chicago showed that the numbers in all combined were so small that added to the records of the Psychopathic Hospital they could scarcely affect the results no matter where the cases were distributed. Nevertheless, the cases for a period of three years were copied from the largest of these private hospitals to see what sort of selection they made. A selection was found, but it was not a selection on the basis of higher economic classes. There were high rates in disorganized areas, and also in residential areas. The selection was a selection of Jewish patients. When this was found, the special study of Jewish rates mentioned above, was done over, adding these cases to the others. The results were not changed.

It is quite possible that selection of insane people by these areas has an effect on the rates. An adequate study to determine the extent of this selection is very desirable. But to explain away the concentration by stating that it must be a selection, is not justifiable when we examine distributions of various types of insanity. For they are not all concentrated in these sections. Certain types are concentrated outside of the disorganized areas. Manic-depressive, for instance, is one of these. Some other types show no concentration at all in the data used, e. g. the hereditary psychoses mentioned earlier, and the senile psychoses. The explanation of concentration, in those psychoses found to be concentrated, must be a different explanation in each case.

In some cases this explanation is not difficult. In paresis the chief etiological factor is a syphilitic infection. A distribution of paresis rates, and another distribution of deaths from venereal diseases, shows the same pattern, i. e. a high concentration in the Negro area, and in hobo areas, and a somewhat less dense concentration in the rooming-house districts. The relationship of the ecological process to promis-

cuity in sex relationships and venereal infection is brought out in studies by Reckless, and a study by Cressey.

The explanation of the concentration of manic-depressive psychoses must be made on some other basis, and will be an explanation for manic-depressive alone, as its distribution is unlike that of any other mental disease.

The sharpest concentration of all insanities is shown in the distribution of schizophrenia, which is found in and near the central business district, and in the immigrant and Negro areas. These cases are more than one-third of the total and dominate the distribution of all insanities together. The interpretation of this concentration will also have to be the subject of a separate study.

To summarize: it has been shown that high insanity rates are concentrated in the disorganized districts in and near the center of the city. This concentration can not be explained merely by the fact of density of population near the centers, poverty of the people, racial and national characteristics, or selection of the unfit by these areas. It is found that the different types of insanity are not concentrated in the same way; in fact, some show no concentration at all. A different explanation is needed to explain the different distributions found, but the connections in each case must be made in terms of the life and experiences of the people as determined by the ecological process, rather than in terms of their heredity, cultural peculiarities, etc. Further and more accurate study is desirable, and it is highly probable that an enlightening discovery with regard to human nature, mental life and sanity, will result from pursuing these problems.

INDEX NUMBERS IN MATHEMATICAL ECONOMICS

By GEORGE R. DAVIES

The long period of development of index number theory, culminating with Professor Fisher, was apparently a steady progress toward mathematical accuracy and validity. Recent writers, however, such as King, Haberler, and Keynes, have severely criticized the concept of a mathematically valid general index number. Hence at present there is much skepticism with regard to the reliability of all such computations, particularly those involving variable data.

Looked at from a broad point of view, the present distrust of index numbers may be considered a part of the deepening distrust of all economic theorizing. But apart from this general bias against index numbers as a phase of supposedly scientific economics, it is possible to distinguish two specific situations which may largely account for the present prejudice. The first relates to the nature of the data and the second relates to certain paradoxes involved in the processes of computation. These situations will be considered in the order named.

Since index numbers of the general market consist in effect of comparisons of averages of prices or of production, they cannot achieve a high degree of dependability unless the averages are based upon homogenous and regular data. As Zizek has pointed out, an average may be regarded as most valid when the units are similar, the dispersion small, and the distribution normal. When these conditions are met, the averages may be regarded as valid, and comparisons based upon them may be considered reliable. There is, of course, no accurate measure of validity in this sense of the term. There are merely degrees of validity which must be evaluated on the basis of the use to which the derived averages and indexes are to be put. In this respect averages merely present in exaggerated form a difficulty which is involved in all mathematics, since numbers themselves are abstractions which assume identities where absolute identities do not exist. In their very nature, therefore, they depart from an accurate picture of phenomena, and are justified only by their utility.

Most of the criticisms of index numbers recently adduced by Keynes, and to some extent by Haberler, are concerned with the heterogeneous and chaotic nature of the data from which they are derived. The development of mathematical economics, as pointed out by Bousquet, throws much light upon this point.[1] Because of rapid change and lack of control and balance, economic phenomena are in a constant state of

[1] The writer attempted to develop this point in "The Significance of Economic Law," American Economic Review, pp. 450-462, September, 1931.

flux, seldom even approximating the equilibria of economic law and not conforming at all closely to the natural biologic distribution of human capacities which underlies them. Not only do they register unplanned and unanticipated change, but they are constantly being disturbed by mob-like speculative movements and the breakdowns that follow them; as well as by the wars which naturally arise out of the titanic struggle for privilege. Hence they furnish a very insecure basis on which to rest averages and index numbers. There is much force in Keynes' contention that a rich man and a poor man live in different dimensions so that an index number comparing or presumably combining their purchasing power can have no meaning. Biologically, individuals are variants in fairly systematic distributions, but economically they are in different universes, as indicated by the abnormality of the curve of income.[2] Hence it can hardly be expected that index numbers can attain high validity even though the mathematical aspects of the subject may be fairly well developed.

The second source of confusion affecting the reputation of index numbers lies in the mathematics of the subject. It is necessary first to observe that mathematics can deal only with relative rather than absolute values; that is, subjective aspects of value are excluded except possibly in minor cases such as the equating of sensitivities, as suggested by Keynes and Haberler. This is not to deny that there is such a thing as social value, it is merely to emphasize the obvious fact that we have, as yet, no significant measure of it.

The task of measuring general index numbers of a part or a whole of a market considered as a universe, or as a sample representative of the universe, resolves itself into two separate problems. In the first place there is involved an averaging of prices as ratios of values to quantities, and a comparison of the averages, or else a direct averaging of double ratios in the form of relatives. In the second place there is the problem of aggregating incommensurable physical units which is implied in even a price index, since an unequivocal value index is always theoretically obtainable. Since both of these problems are involved in the making of general index numbers, it may prove advantageous to separate them for purposes of analysis.

The traditional method of approach to general index numbers, as illustrated in the work of Professor Fisher, lies in an evaluation of the results obtained by the use of various methods of averaging and weight-

[2] The curve of income is a compound of earned income and unearned income. It is the latter element, apparently, that makes the upper end of the distribution roughly a straight line on double-log paper, as Pareto noted, instead of a parabola. The whole income curve has a coefficient of standard deviation about 20 times that of most distributions of human characteristics. The latter generally conform to a normal curve. Such a curve fitted to the log quartiles of income gives a good fit up to $4,000, but at $10,000 is only 8% of the actual, and at $75,000 is not 1% of the actual. Indeed a log point binomial would have its upper limit not far fom $20,000.

ing. It should not be considered a lack of appreciation of the monumental contribution which Professor Fisher has made to the subject to suggest that it is now possible to make a more direct approach. If averaging is to be considered strictly a process of equating deviations rather than a process of approximation or a selection of a subjectively satisfactory type, then we must define the weightings strictly in accordance with the data themselves.[3] In so doing we shall eliminate at the start certain forms of averages, and with them the whole problem of bias of weight correlation or base period, at least in a theoretical approach.

That the choice of an average must be determined with reference to the data themselves is evident from the fact that different types of averaging, including the transformation of data to relatives, constitute, in effect, different weightings of the data. Therefore the bias of an average or a base period is implicitly a variation produced by variable assumptions. For example, the unweighted harmonic mean is merely the arithmetic mean on the assumption that equal expenditures are made at each price. The geometric mean in data symmetrically distributed on a logarithmic scale is equivalent to an arithmetic mean of the given items weighted by the square root of the reciprocals of the items, respectively; that is, the weightings are the geometric means of the respective weightings of the arithmetic and harmonic means. This is a type of weighting which is strictly indicated in certain cases of the averaging of ratios, where the geometric mean is often employed. With irregularly distributed data, the weighting implied in a geometric mean requires a more complex expression, but the mean still is equivalent to the arithmetic mean weighted for certain unspecified assumptions of data. Likewise the changing of group comparisons to relatives involves a weighting which reduces the denominators of the common summary mean, as Fechner calls it, to a common denominator. Hence the various approaches to averaging imply variable weightings, and these in turn imply variable data, whereas a problem, adequately reported, furnishes fixed data.

In so far as index numbers represent a problem in the averaging of ratios, excluding the problem of aggregating incommensurable physical units, the method of computation may be conveniently studied by reference to the averaging of ratios in other fields. Quantity and value, and their ratio price, may be compared with time and distance and their ratio speed. It should first be observed that in both cases we are

[3] The equating of positive and negative deviations implies the arithmetic or geometric mean according as arithmetic or logarithmic deviations are assumed. Both of these means are considered in the discussion that follows, but the arithmetic mean is given precedence since it harmonizes with aggregative methods. Other means, such as the mode and median, may be disregarded as generally failing to meet certain important tests. However, if the distribution is normal, the mode is identical with the arithmetic mean; while if it is logarithmic normal, the median is identical with the geometric mean.

dealing with two fundamentals making up a ratio. The fundamentals themselves are not ratios except in the sense that all numbers are ratios. Quantity and money, time and distance, are expressed in terms of an arbitrarily chosen unit which constitutes the unit weight of averaging, and the average is therefore said to be unweighted. But price and speed are ratios in a secondary sense and must be weighted by the fundamental of reference, in order that the actual units may be taken into account. In other words, the weights are merely expressions of the frequencies with which given ratios recur. The ratios may be expressed as reciprocals, in which case the weights shift to the alternate fundamental. If this analogy holds, one of the traditional tests which regards quantity and price as analogous to two sides of a rectangle expressing value, is misleading.

If in the averaging of the speed of given runners from one day to another the calculation is to be based on relatives; that is, if the speed of a given runner today is first compared with his speed yesterday, then a problem in the averaging of double ratios is presented. The weights of double ratios, and likewise the products obtained in weighting, are themselves ratios, and call for a weighted mean instead of a total, a process which may be called double weighting. Such weighting meets the paradoxical requirement that, in exceptional cases, the actual average increase of speed may lie outside the range of the relatives—a situation which is logical since, though all runners should increase their speed on the second day, the average rate of running might be lowered by a greater use of the slow runners. As we shall see later, this feature of the averaging of price relatives carries over to index numbers of prices, but it does not apply to quantity or value relatives, which are not double ratios. To sum up: An average of fundamentals with unit weights directly equates the variability of the items from the simple mean; an average of ratios with appropriate fundamental weights likewise equates the variability of the items, but may vary widely from a simple mean of the ratios; and at a still higher level of complexity an average of double ratios, double weighted with ratios, may actually fall outside the limits of the double ratios themselves if it is to equate the variability of the fundamentals involved in the problem. Thus the ratio of the weighted averages and the double weighted average of the double ratios become identical. Because of the paradoxical nature of the averaging of ratio relatives, it might be best to exclude them altogether, and to confine the theoretical making of index numbers to aggregative methods.

We may turn next to an analysis of the methods implied in the aggregating of incommensurable physical units. Presumably a suitable analysis would show what method is implicitly adopted in any specific form of index numbers, but we may legitimately confine the present discussion to the ordinary Beta and Gamma formulas; that is, Las-

peyer's and Paasche's formulas for price and their analogous formulas for quantities, since Fisher, Olivier, Haberler, Keynes, and others agree that the most adequate result is delimited by these formulas. It is easily shown by simple arithmetic that the aggregating of incommensurable units involved in these formulas is the familiar one which Keynes revives in his recent analysis; namely, the re-measuring of physical units in terms of a value unit such as a dollar's worth. A Beta price index and a Gamma quantity index are the logical and consistent results obtained by averaging ratios according to the principles already discussed in problems of speed, if physical units measured in dollar's worths at prices in the given year are assumed.[4] Similarly a Gamma price index and a Beta quantity index are logical and consistent results on the assumption of physical units measured in dollar's worths at prices in the base year. Hence Fisher's "Ideal" index is a mean of results obtained by the adoption of alternate standards of aggregating incommensurable units. We reach, therefore, the important conclusion that index numbers rest upon the assumption of what by analogy with physical measurements may be called a frame of reference. That is, the problem of index numbers illustrates, in a very simple form, a principle which in physics takes most complex forms; namely, that measurement is not necessarily absolute, but may be variable according to the standard or frame of reference chosen.

It will, therefore, be seen that the difficulty with respect to the circular test arises only because of a confusion of frames of reference, and it disappears when one consistent with three or more time periods is adopted. For example, if the prices of the base year are taken as standard; that is, as determinative of the physical units, then the mathematical tests of validity, including the circular test, are fully met for any given series of index numbers. It is equally evident that if results consistent from a broader point of view are desired, a broader frame of reference may be adopted. For example, if the assumed standard price is defined as the weighted arithmetic mean of the prices of each commodity during the whole interval studied, then consistent and logical results may be obtained with respect to this frame of reference. In such a case the total quantities and total values for the whole interval are necessarily equated. And the ratio of price levels from one period to another may fall outside the range of the corresponding relatives, as in the case of speed comparisons. Thus, mathematically consistent results with respect to a chosen frame of reference may be obtained from a given or a sampled universe of data, irrespective of whether the data are homogeneous and regular. It may be assumed that Keynes does not intend the statement to be

4 The terms Beta and Gamma are generally applied to base weighted and given weighted aggregative price index numbers, respectively. But the terms may also be used to designate base weighted and given weighted aggregative quantity indexes.

taken seriously that mathematically valid results are undesirable because of the irregularity of the data from which they are usually obtained, since if this is the case most mathematical formulas of measurement fall to the ground because they are liable to be abused.

If the analysis just made is correct, the relativity involved in aggregating incommensurable units is as great an obstacle to a definite mathematical index as is the irregularity and inadequacy of the data. For there are many possible frames of reference which might plausibly be adopted, any one of which may produce a variant result. It might, for example, be considered desirable to extend the period from which the standard price is chosen, thus as it were determining a stable base line from which the temporary residuals of change could be measured. And in striking such an average something might be said for dropping the weightings and averaging merely the individual price levels at the disparate periods of time. While this procedure would not be in harmony with the criterion of an average adopted in an earlier part of this discussion, yet it might be defended here on the ground that an arbitrary choice must necessarily be made of a point of view from which quantities are to be aggregated, while in the actual aggregating, weightings are determinate. Further, certain other criteria might be adduced. For example, the arithmetic mean of the whole interval might be considered inadvisable because it allows the computed ratios of quantity to be upset by a hypothetical monetary inflation restricted to a part of the whole time interval. It might be argued that it would be better to adopt a standard price which would carry the effect of such hypothetical inflation merely to price indexes and not to quantity indexes. To meet such a criterion of choice, the unweighted geometric mean of the period covered must be adopted. To be sure, this mean has the peculiarity that it is also the ratio of the like means of the corresponding fundamentals, quantity and value, and therefore it may be regarded as having a somewhat greater validity than an ordinary unweighted average. But, as in the relativity of physics, there is only convenience, propriety, and utility to be urged in favor of one frame of reference as against another.

The variability of results from different frames of reference suggests the possible existence of an invariant system of equations by which results consistent with every standard of reference could be obtained. It may be that mathematicians investigating the problems of economics will discover such a system, and with it will establish new standards of measurement of an economic universe. Something like a consideration of quantities as components of a vector may be indicated. But at present nothing appears to be in sight. That such a system may eventually be developed, however, is suggested by the fact that geometric means give a superficial invariant system in which, when common elements are used throughout, the various frames of reference cancel,

in which averages of ratios and ratios of averages are identical, and in which the mean price, whether expressed as a ratio of dollars to goods or goods to dollars, is the ratio of the mean of quantity to value or value to quantity. But this system of measurement does not recommend itself for practical use since in effect it implies that each commodity tabulated constitutes a unique unit, clearly distinguishable from all others. Hence in practice it becomes variable through more or less arbitrary classifications of closely related physical quantities.

Moreover another consideration of a very general nature points in the direction of a standard price obtained by arithmetic means. As Walsh has argued, if all ratios of money to goods and goods to money in every unitary trade in a system of exchanges are included, the average should be unity. That is, the price level in any market considered as a universe is always unity, except as the ratios of all goods to one standard good are isolated, as in the ordinary measurement of prices. This consideration points to the weighted arithmetic mean, already described, as the correct result in any chosen frame of reference.

If economics in a thoroughly scientific mathematical form is to be developed, then the problem of theoretically correct index numbers applicable to large aggregates of data will soon be of great significance. It is quite possible that during the next few decades there may be a great expansion of statistical activity aimed at presenting a picture of the course of national business in the aggregate and in detail. The future may see mathematical computations of specific equilibrium prices; if so, the general production and price equilibrium of which the specific problem forms a part will be required. It is very probable that when the statistician attacks these problems he will find himself unexpectedly handicapped by the lack of any precise theory of the nature of so fundamental a thing as the measurement of aggregate market change. However visionary it may now appear, I venture the prediction that sometime in the future when the world really desires to reduce its economic chaos to order, it will develop mathematical economics in theoretical and practical form to a stage fully commensurate with the mathematics of astronomy and physics.

BROKERS' LOANS

By LEWIS H. HANEY

I

A broker's loan, as the term is used in current statistics, is a loan on security collateral made to a stock broker or a dealer in securities.

Brokers' loans represent credit used in security markets, chiefly for speculative purposes. Both the call-loan and the time-loan markets are involved, and it should be remembered that normally brokers' loans furnish a *useful* outlet for surplus funds of banks and corporations which must be kept liquid. But speculative requirements are the controlling factor.

Brokers' loans are chiefly made to stock brokers in New York City and are required for carrying on speculation on margin. The bulk of such loans goes to support margin trading on the New York Stock Exchange. This is apparent because of the nature of the loan (brokers borrow for the purpose of carrying margin clients), and is clearly indicated by the relative movements of brokers' loans and the stock market. I have compared the week-to-week and the month-to-month movements in brokers' loans with those in various indexes of stock market prices, and I find that the two show a substantially parallel course about 75% of the time. Moreover, the chief exceptions are more apparent than real, since they result from the usual lags which occur at the turns in the two series.

It can also be said that the general levels of brokers' loans and stock market averages are probably similar, the exceptions occurring in periods of extreme inflation and deflation.

Probably the best way to consider this obvious relationship is to look at brokers' loans and the stock market trend as results of a common cause. From a short-time point of view, however, it has become customary to consider the loans as largely a *result* of the stock market, and this is probably well enough for practical speculative purposes. It should be remembered, however, that brokers' loans may themselves become a *causal* factor affecting the stock market, as was true in 1929 when the abundance of funds poured into New York by corporations and foreign leaders encouraged and facilitated speculative pyramiding.

Not all speculative credit, however, takes the shape of brokers' loans. There are "day loans" which professional traders depend upon largely to finance their daily operations and which are largely balanced at the end of each day with the aid of the Stock Clearing Corporation. Then there are the direct loans on securities made by banks to non-brokers. These may represent considerable speculation on the part of others than margin traders. Institutions and individuals put up the securities

in which they are interested as collateral for bank loans. The banks thus become more directly involved than in the case of loans made through brokers, and this situation constitutes one of the most important worries of the New York banks at the present time (Dec. 1931). (Generally, these non-brokers' loans on securities showed a rising trend from 1923 to the end of 1929. They then dipped, but rose again in the second half of 1930, when they were exceeded only in 1929. They have fallen gradually in 1931, but represent a hang-over from 1929, and show that the back of the New-Era delusion was finally broken only late this year.)

We must recognize that no available data give us the total of all loans made by brokers in the United States. I find that they fall short in two respects: (1) we have no information about those loans made by others than member banks in New York City *to* brokers or dealers who are not members of the New York Stock Exchange; (2) we do not know the amount of brokers' loans arranged directly by banks or other agencies outside New York City. Therefore our composite total of known brokens' loans is doubtless appreciably less than the true total.

In the second place, neither of the two series of data available (the monthly reports of the New York Stock Exchange and the weekly reports of the New York member banks) covers the total known brokers' loans. I find that the Stock Exchange figures range from 73 to 90% of the total known brokers' loans, while the Federal Reserve Bank figures range from 71 to 77%.

This, however, is unquestionably a sufficiently large sample to enable us to deal statistically with the subject; but it is to be remembered, in reasoning about the proportion of the total supply of credit which goes into brokers' loans, that we do not know the true total of the latter.

More important for our immediate purposes is the fact that brokers' loans figures are not sufficiently analyzed and broken down to enable us to deal satisfactorily with them. Obviously a loan to a stock broker has a different significance from one to a dealer in bonds, yet the two are not separable in the available data. Obviously, moreover, loans by others than banks have a separate and important significance, yet the so-called loans on account of out-of-town banks are not broken down into those made by such banks for their own account and for others. I estimate that such loans by out-of-town "others" in October 1929 amounted to as much as one billion dollars.

II

I find that brokers' loans depend on the following factors: the number of margin traders, the amount of stock bought on margin as compared with the amount sold short, the price of the stocks bought, new security issues, the amount of customers' credit balances held by

brokers, and the supply of funds seeking an outlet in the short-time money market.

It may be well to discuss very briefly the more important factors.

More than 50% of the influences bearing on such loans is found in the operations of margin traders, the chief factor being their purchases for "long" account. It seems that the only way one can explain the generally parallel movements of brokers' loans and stock market averages is on this assumption. Moreover, I find some evidence that the volume of trading, in number of shares bought and sold, appears to have some independent significance. In those cases in which brokers' loans move opposite to the movement of the stock market, the volume of trading often moves as do loans. This appears chiefly to represent "distribution" when stocks react following a period of rise.

Issues of new securities on the whole do not have the influence on brokers' loans which many had supposed. For the purpose of testing this relationship, I have depended chiefly upon a comparison of the movements of new security issues with the movements of brokers' loans in those cases in which the brokers' loans diverge from the stock market averages. Such a test fails to establish any significant correlation.

I find that when new securities are issued there is often some effect apparent, but that any effect is only for a short time. For example, the closest correlation is with the weekly figures for security issues as compared with weekly brokers' loans. I also find that stock issues have little appreciable effect, but that bond issues do. In general, there is no close quantitative relationship between security issues and changes in brokers' loans. One might suppose that if any part of brokers' loans were to correlate with new security issues, it would be the time loans to brokers. It is interesting, therefore, to note that there appears to be no correlation whatever in this case.

A study of the practical operations connected with new security issues strongly suggests that any effect on brokers' loans would be as likely to come as a result of difficulty in distributing the new issues and the consequent necessity for carrying them, as from any other result.

Probably the only other factor which is not directly dependent upon margin trading and movements of stock prices, is the amount of demand deposits in the New York banks as affecting the *supply* of brokers' loans. There is reasonably clear evidence that the loans to brokers made by New York banks on their own account, vary in the same direction with their net demand deposits so frequently that they are a factor to be reckoned with in this connection. This factor appears to explain some of the cases in which brokers' loans diverge from the stock market averages.

Finally, we should note that there are evidences of periodic move-

ments in brokers' loans under the influence of interest and dividend payments and the income tax dates. The quarterly periods of maximum interest and dividend payments affect principally the brokers' loans made by "others" than banks. I find considerable evidence that the loans as reported by the Stock Exchange tend to vary directly with the interest and dividend payments, while those reported by the New York Federal Reserve Member Banks tend to vary in the opposite direction. This is one of numerous indications that the two series represent a different composition of both lenders and borrowers. The income tax dates also put an extra load on the Federal Reserve Banks and this is often reflected in brokers' loans.

III

The mention of the supply of credit available, raises the much mooted question as to the effect of brokers' loans on the supply of credit for business purposes. A careful examination of the developments of the past few years leads me to the conclusion that brokers' loans unquestionably draw on the general fund of credit and therefore affect the supply of credit available for business purposes. In 1928 and 1929, business and the stock market now clearly appear to have been competing for funds. For example, it can be sufficiently demonstrated that the rediscount function of the Reserve Banks was used by the member banks to get funds for making loans to brokers. We find, in a majority of cases, movements in the "bills-discounted" item paralleled movements in brokers' loans "for own account," while the contrary is true of "commercial loans." In November, 1929, the commercial paper rate decreased and commercial loans increased. Since brokers' loans fell, this situation indicates that brokers' loans had been a factor in keeping commercial money rates high.

In 1929, too many economists defended brokers' loans as being a means of securing capital for industry and as not withdrawing credit from industry. They argued that bank credit in the shape of brokers' loans became deposits to corporations, that mere buying and selling among margin traders does not affect brokers' loans, etc. But the facts show that corporations or banks used deposits to make brokers' loans, and that the funds loaned to brokers accumulated in the New York money market where they were used merely to feed the flames of speculation. Moreover, buying and selling puts stock prices up, and this requires loans in excess of any deposits. Not only was the reasoning of these economists erroneous, but the nature and purpose of such loans is such that they can not be such a means of corporation finance. At most they serve only to facilitate the distribution of securities, and the sounder and more easily distributable the securities are, the smaller the loans to dealers. In fact, to the extent that brokers' loans facilitated stock issues in 1929, they encouraged overcapitalization, or ex-

cessive plant capacity, or both. They encouraged traders to bid up prices and erect a credit structure not required by business—the collapse of which was disastrous to business.

The whole point is that stock market booms, swollen brokers' loans, and attendant huge stock issues are all results of a common cause, namely speculation. Brokers' loans are the best measure of the credit drawn into speculation.

Just a word here about proposals that corporate securities be made eligible for rediscount. In my judgment, this would be thoroughly undesirable and dangerous. Even without such a letting down of the bars there was a great diversion of bank credit into speculative channels. If anything, additional measures to prevent this are required. I am deeply impressed with two facts: one is the difficulty of drawing any line among securities; the goodness of securities is relative. The other is that "liquidity" and "soundness" are two very different matters. A "good" man need not make a good executive, and a "good" stock or bond may become very badly "frozen."

IV

Whether from the point of view of the money market alone, or from the point of view of the relation of the money market to the stock market, one of the most important matters upon which brokers' loans throw light is the condition of demand and supply in the New York money market.

Money rates represent the market price paid for the use of money. They are the result of the interplay of the forces of demand and supply in the money market. To the extent that we can measure any of these demand or supply factors, we can draw inferences a to the relative force of the other factors which remain unknown. This line of reasoning is similar to that opened up in connection with my P/V Line.

What measurements are available for this purpose? They are as follows:

(1) *Money rates.* For the purpose of studying the New York money market in relation to brokers' loans we may use a weighted average of call- and time-loan rates, the weights varying according to the proportion of demand and time loans reported. Let us call this average of interest rates, "I". It is adjusted for seasonal variation.

(2) *The total known volume of security loans* represents at least a large part of the supply of credit actually made available for buying securities. (It is determined by adding to the total security loans reported by the Federal Reserve Bank, member bank loans for "others" (also reported by the Reserve Bank) and the loans by "private bankers, brokers, foreign agencies and others" as reported by the Stock Exchange.) This measurement may be designated as "V".

(3) *"Brokers' loans"* themselves represent the volume of credit

supplied to traders in securities through brokers (plus some credit used to carry new securities—chiefly bonds.) Let us call this "v".

(4) *The total value of stocks traded* may be estimated, or at least the trend of such value. This may be done by multiplying shares traded by a comprehensive average of share prices. The result may then be considered as measuring the two chief items affecting the demand for speculative credit—namely, stock prices and the volume of trading. This factor we will call "D".

Now what can we do with these measurements? Can not we make certain deductions concerning the demand for or the supply of speculative funds at New York?

As a first step, it is suggested that the ratio between money rates, I, and total value of shares traded, D, is of significance. If "I" rises, the rise must be caused either by an increase in demand or a decrease in supply, or both. If, therefore, we find an increase in "I" while "D" remains unchanged, we can infer that the supply of funds available must have declined or be tending to decline. Without further illustration, it is apparent that if we eliminate the effect of changes in D (demand) from I (money rate), we secure an indication of the changes in supply of funds. Hence the significance of the I/D Line.

When the I/D ratio rises, it means that money rates have risen more sharply than the speculative demand for funds, and that the supply of funds has probably declined. The conclusion is reversed when the I/D ratio declines.

In presenting the I/D Line as an indicator of the supply of funds, therefore, we plot it on an inverted scale—upside down.

This barometer shows a general upward trend from May, 1926, to February, 1931. From the latter part of 1928, however, the gain was relatively slight, and from October 1929 to June 1931 the maximum level remained practically constant.

Evidently the supply of funds in New York available for speculation (after a drop at the end of 1929) remained very ample in proportion to demand throughout 1930 and early 1931.

In much the same way as the foregoing, we may reason that the variation in the ratio between the supply of speculative loans and the rates on such loans must throw light on the variations in demand. If we eliminate the effect of change in supply from the money rate, there presumably remains something resembling the changes in demand. In other words, suppose that money rates rise in a month in which the supply of funds remains unchanged. It seems clear that there must have been an increase in the intensity of the speculative demand for funds. Or if the money rate falls more sharply than the supply of funds, the demand probably has decreased.

Accordingly, I have computed the ratios, I/V and I/v, the one based on total security loans, the other on brokers' loans. Both ratios are

used: for, while brokers' loans are more directly related to the New York money market, total security loans are also related, and to a considerable extent non-brokers' loans may be substituted for brokers' loans (as in late 1929). Brokers' loans are put on an average monthly basis and adjusted for seasonal variation. Total security loans are as of the week nearest the end of each month and are not adjusted except to eliminate long-time trend from the direct bank loans on collateral. Money rates are computed and adjusted as in the I/D Line.

Unfortunately, our measurements of supply are not only imperfect in themselves, but also they probably do not represent the quantity of credit which really figures in *determining* the money rate. The volume of security loans may represent credit actually supplied, but not necessarily credit *available* for supply. Perhaps this is in part the reason why the I/V Line (ratio of money rates to security loans) appears to vary more closely with the money rate itself than with a distinct rate-determining demand factor. That is, by eliminating the change in the quantity of credit actually supplied at the going rates, we do not completely eliminate the supply factor. Even so, however, it seems that when money rates increase more sharply than the volume of credit supplied, we may infer an increase in demand, and vice versa.

At once, one notes the more cyclical appearance of these ratios. This suggests that the *demand for speculative funds is more influenced by cyclical conditions than is the supply, and that the cyclical swings in money rates are largely due to changes in demand.* Certainly, the changes in the volume of funds supplied, when "eliminated" from the changes in money rates, do not diminish the cyclical movements.

We also find a considerable similarity between these derived barometers of demand and the volume of member bank borrowings from Reserve banks.

The higher level of the I/V Line, as compared with the I/v Line, in 1928 and 1929, is due to the fact that the brokers' loans became abnormally expanded in these years, increasing more rapidly than non-bankers' loans or the total known volume of security loans. Evidently brokers' loans are the more subject to the influence of high money rates and to speculative inflation.

On the whole, the I/V Line more closely resembles bills discounted (member bank borrowings) than does the I/v Line, both in levels and in fluctuations.

If we accept the I/V Lines as affording some general indication of the demand for speculative funds in New York, it can be said that demand rose gradually to a peak in September, 1926; fell to a low point in November, 1927; rose to a great cycle peak about April, 1929 (though this was not much above September, 1928); and declined until at least June, 1930. Since then the trend may be described as

"irregularly sidewise" until about May, 1931. A notable rise in indicated demand came in September.

At the end of 1927, and again in the middle of 1930, the indicated supply of funds was large while the indicated demand was low. The wide spread from mid-1930 to February, 1931, truly indicated the coming of extremely low call and time money rates. That rates in 1930 were lower than in 1927, however, is seen to be due to the relatively lower level of demand (I/V).

In May, 1931, it was apparent that it was only a question of time before the withdrawal of funds by outside banks and private agencies would greatly reduce the available supply of speculative money in New York and cause a large decline in the inverted I/D Line. Since demand was near minimum levels, this checked the decline in money rates. From April or May, 1931, the trend of the demand curve was upward, while the supply curve trended down from February. The sharp rise in money rates in September was thus in the making. If these barometers are as sound as I think, further and increased tightness in money rates is to be expected, barring artificial factors. In November, the demand curves rose to new peaks (frozen!) while the supply fell to the lowest level since the drop in mid-1928.

TECHNOLOGICAL CHANGE AS A FACTOR IN UNEMPLOYMENT

(Discussion) By BORIS STERN

In the course of my recent studies on technological displacement of labor I was called upon time and again to determine what is really meant by technological change, and particularly to define the scope and the extent of its influence. In the following two examples, both of which are taken from my own field work, I hope to convey to you the difficulties with which one is confronted in this comparatively new field of research and to emphasize the need for a generally accepted definition of the terminology and the scope of this type of study. My first example is from the amusement industry. The most revolutionary technological change in this industry in recent years was the installation of sound equipment in the motion picture theatres, which resulted in the immediate displacement of more than fifty per cent of the musicians formerly employed to accompany the silent pictures. Indirectly, however, the introduction of sound affected the entire field of amusements. Whether due to the novelty of sound pictures or to some other cause, the larger majority of the legitimate and vaudeville theatres in the country found themselves without patronage and were compelled either to close shop or to revert to motion pictures, eliminating the artists, musicians, stage hands, and other help formerly employed in these theatres. Are these workers also to be classified among the technologically unemployed in the amusement industry?

But the impact of the change from silent to sound pictures went further than that. The rapidly declining demand for musicians seriously affected the domain of teaching music, with the result that a very large proportion of music teachers found themselves without means for a livelihood, thus still further swelling the ranks of unemployed musicians. I could go on and continue to trace the effects of this single change in the motion picture theatres, even extending beyond the amusement field into several other industries only remotely related to this field. The question is, are we to make a complete investigation of our entire economic and social order each time one undertakes to study the effects of some technological change in a single industry.

In my second example I was confronted with a different set of circumstances. The industry in question is comparatively young, but has grown very rapidly in the last decade or so. The Bureau of Labor Statistics Productivity Index for this industry shows a large increase in the labor productivity which has been accomplished in the brief span of a few years. Upon visiting several major plants I was much

surprised to discover that the increase in the productivity has not been accomplished by the usual means of what are generally known as labor saving devices or new machinery. In fact, the industry still employs a very large proportion of skilled workers on a piece work basis and can still be classified as belonging to the semi-automatic stage, with a decided predominance of hand work. Further inquiry as to the causes of the increased productivity of labor in one of the largest plants in the country brought out the following major factors: "Standardization of the product; a change in the cost accounting system which resulted in an improved coordination of the numerous semi-independent factory departments engaged in the preparation of the various parts which make up the final product; a change in the labor policy of the plant which resulted in a reduction of the labor turnover from 200 per cent in 1920 to less than 40% in 1929 and slightly over 10% in 1930. It was the belief of the general manager that the reduction in the labor turnover of the plant was more responsible than any other single factor for the large increase of its labor productivity. Are these unquestionably real causes of labor displacement to be classified as technological changes, or are we to devise another set of terms to differentiate them from changes in methods of production and in machinery?

Confronted with these and similar complications in my field work, I was compelled to adopt a set of rules which I venture to present here as a starting point towards a general definition of the term: "technological change" and towards a reasonable limitation of the scope of influences attributed to this factor. I was compelled to limit the effects of technological change strictly to the individual industry in which this change took place. Within the industry and particularly within the walls of a single plant, I was compelled to classify as technological change any change, either in the nature of the product, in the method of production, in the type of labor or in the equipment or machinery used which resulted in a higher productivity therefore displacing labor. This in accordance with the actual conditions in the plants where seldom, if ever, is it possible to segregate any one factor that could be singled out as "the cause" of the increased productivity of labor in the plant.

With "technological change" thus defined and limited, the problem of its measurement does not present any particular difficulty. Its natural yardstick is the quantity output per unit of labor time, the unit of output varying in the different industries. This seems to be the underlying plan of the series of productivity studies which the Bureau of Labor Statistics has been carrying on for several years. I should extend these studies over a larger number of industries than heretofore practised by the Bureau. Besides I should also expand our industrial census to include such additional information as will

be necessary to enable us to build up a series of continuous industrial indices of labor productivity, in the principal industries. Their primary object shall be to focus our attention on the particular industries which show a rapidly rising index, thus inviting a more intensive survey of the industry in question. Finally, I should inaugurate a series of larger industrial surveys covering the several industries affiliated in any one field, such as fuel, transportation, amusements, etc., to determine the effects of technological changes on the entire group. If labor is displaced in the coal industry, either because of labor saving devices or because of a decreased demand for coal, it is indeed pertinent to know to what extent the labor released in the coal pits can find employment in the oil industry or in the production and distribution of gas and electricity. Similarly, if the railroads and street cars are cutting down their labor we should know at least what opportunities of employment there exist in the newer branches of transportation, such as bus lines, taxicabs, aeroplanes, etc. In the course of these larger surveys it will indeed be desirable to incorporate sample follow-up studies of what actually happens to the groups of workers displaced because of technological or other changes in the industry.

With this triple attack on the question of technological change, namely, by building up with the help of the census bureau a series of continuous industrial indices, by continuing and extending the productivity studies of the Bureau of Labor Statistics, and by inaugurating a series of industrial surveys to cover groups of affiliated industries, we shall indeed be in a much stronger position than heretofore to cope with the economic and social problems which are the inevitable result of this dynamic force in our industrial structure.

I am glad to note that my outline differs only slightly from the plan presented by Professor Jerome. It is less ambitious and for that reason perhaps easier to fulfill. I certainly do hope that this is the type of study which Dr. Slichter intends that his proposed Federal Labor Board should carry out, and I heartily agree with him.

THE TABULATION OF POPULATION DATA BY CENSUS TRACTS FOR CITIES IN THE UNITED STATES

By LEON E. TRUESDELL

The absolute unit in the population census is the entry for one person made by the enumerator on one line of the Population Schedule. Space is provided on the schedule for the answers to a maximum of 26 questions about each individual, and for 100 individuals. The preliminary announcements of the total population of the various areas in the United States are based on a count of the names on the schedules.

The first stage in the process of tabulating the answers to the census questions is to examine the schedules to make sure that the entries are complete, and to supply code numbers for certain items, like State or country of birth and occupation.

The second step in the tabulation process is to punch a card for each person. The population card contains 15 fields, in each of which are punched one or more holes, indicating the answers to the questions on the schedule. These cards are punched by enumeration districts; that is, there is at the start a separate box of cards for each enumeration district. A brief tabulation, classifying the population by sex, by color, and by age, is made by enumeration districts. This we call the First Count.

For the next tabulation, the cards are thrown together in general by counties, keeping separate, however, the cards for every incorporated place having 2,500 inhabitants or more, and for the wards of the larger cities. For this tabulation the cards are first sorted by sex, and then by color, and those representing the white population, by nativity and parentage. This makes 10 packs of cards for each geographic area. In the tabulation known as the Second Count, information is obtained by sex, color, nativity, and parentage, for age, illiteracy, school attendance, and marital condition. On the Third Count, which covers the same areas, the foreign-born whites are tabulated by citizenship and by country of birth, and the native whites of foreign or mixed parentage by country of birth of parents. On the Fourth Count, retaining for the northern states the sort by sex, and for the southern states, the sort by sex and color, the cards representing gainful workers are tabulated by industries and industry groups.

The material which has been transcribed for tract cities is practically all taken from the Second, Third, and Fourth Counts. In some cases the information from the First Count has been furnished by enumeration districts for areas not provided for in the tract layout.

After the Fourth Count is finished, the cards for the counties in each

State are thrown together, keeping separate only those representing the cities of 25,000 and over. From the cards in this form, or with still further geographic consolidation, 8 more counts are made, providing information in more detailed correlations, in particular the very complicated tabulation of gainful workers by occupation and industry.

Special Provisions for the Tract Cities

Certain figures are published regularly in the Census Reports for the wards of cities having 50,000 inhabitants or more. These wards in many cases, however, prove to be not altogether satisfactory as statistical subdivisions of the city. In the first place, they are usually changed every few years, so that it is not possible to make comparisons between one census and another. In the second place, they are rather large. And in the third place, they are usually laid out with little or no regard for the grouping together of homogenous population areas.

The census tracts were devised to remedy these three shortcomings. They are, in the first place, considerably smaller than the wards. In the second place, the city is so subdivided that the population in each tract will be of a similar type. And in the third place, it is expected that the tracts will be maintained without change from census to census.

In some of the cities the tracts are made by subdividing the wards, so that the sum of the population of certain tracts will represent the population of a ward; in other cities it has not been found practicable to maintain the ward lines. In three of the cities in the group first mentioned (Chicago, Cleveland, and New York), the tracts have been grouped into larger permanent statistical areas, approximating the wards in size, and figures are printed in the Census Reports for these statistical areas, rather than for wards.

The first step in making provision for population data by tracts for a city is to establish the boundaries of the tracts. This work requires a careful study of the various areas of the city on the part of some local organization, and obviously, it must be commenced a considerable period in advance of the census date—preferably at least two years. The tract boundaries must be established before the enumeration districts in the city are laid out, because the boundaries of the enumeration districts must conform to the boundaries of the tracts.

The second stage in the process of obtaining the tract figures is to arrange the punched cards by tracts instead of by wards for the Second and Third, and perhaps also the Fourth Counts of the population cards, and to make these counts for each tract. This involves additional labor for the Census Bureau in two ways. In the first place, a set of readings from the tabulating machine must be made for each tract instead of for the much less numerous wards; and in the second place, this large number of readings must be consolidated in order to obtain the city totals for publication in the Census bulletins.

The third stage in the process of obtaining the tract figures is relatively simple, and consists in transferring the figures for the tracts to table forms providing for the information requested by the city. The tract tables are furnished to the cities in some cases in manuscript form, as they are taken from the machine sheets; in other cases, they are typed on specially prepared forms designed for direct reproduction.

A series of 11 standard tables have been devised and arranged in form to produce, with proper reduction in size, pages approximately the same size as the quarto pages of the Census Reports. These standard tables are as follows:

1. Population by color, nativity, sex, and age
2. Foreign-born white population by country of birth and sex
3. Native white population of foreign or mixed parentage, by country of birth of parents, and by sex
4. Population 21 years of age and over by color, nativity, and sex
5. Foreign-born white population 21 years of age and over, by citizenship and sex
6. Population 10 years of age and over by color, nativity, and illiteracy
7. Population 15 years of age and over by color, nativity, sex, and marital condition
8. Gainful workers 10 years of age and over, by industry groups and sex
9. Families by color and nativity of head, and by size
10. Homes by tenure and value or monthly rental
11. Families, radios, dwellings, and quasi-family groups

While the expense for the final typing of the tables is not very great, some of the cities have preferred to receive the tables in manuscript form, and have obtained such duplicate copies as they require by photostating these manuscript tables. Even these tables may be reduced considerably in size with a resultant saving in cost.

The expense of the tract tabulation is paid in each case by some organization in the city concerned. The principal items in the cost of the tract tabulation have already been referred to above, namely, the additional work of making the tabulation for small areas; the work of consolidating these small areas to obtain the regular census figures for the city; and the work of transcribing, and perhaps typing, the figures.

The Fifteenth Census was taken in April, 1930. The tract figures, complete so far as concerns population, were furnished for the first of the tract cities to be completed on May 13, 1931. The last of the 16 cities which are on the list for 1930 would have received their material in April or May of 1932, except for difficulty in some of the cities in raising the necessary funds.

As you can well imagine, the necessary provisions for the tract tabulations for 16 cities have added very materially to the work of the Census Bureau; in particular, they have required additional work at times when the pressure to get out the regular reports was at its maximum. For that reason, the Census Bureau is not anxious to add either to the list of tract cities or to the amount of detail to be shown by tracts. Nevertheless, we recognize the importance of these figures for relatively small areas within the city, to various organizations working on the city's local problems, and are willing to undertake this additional work within reasonable limits for the sake of making the census figures more useful to the people whom they represent.

COMPOSITION AND CHARACTERISTICS OF A TYPICAL CITY ANALYZED BY CENSUS TRACTS

By HOWARD WHIPPLE GREEN

Change in Total Population.

Even though the total population of a city increases from decade to decade it should not be assumed that each and every part increases in a like manner. To illustrate this let me cite the experience of four areas in Cleveland. Census tract I-1 which had a population of 5,260 in 1910 now has 197 and the census tract J-1 with a population of 6,114 in 1910 now has 49, while census tract T-8 with a population of 59 in 1910 now has 10,577 and the area now the city of Shaker Heights with a population in 1910 of 680 now has 17,783.

Cleveland like most large industrial and commercial centers is decreasing at the core and increasing enormously at the periphery. Even the center of New York City, the Borough of Manhattan, decreased 47,439 or 2 per cent between 1910 and 1920, and 416,791, or 18 per cent, between 1920 and 1930. Knowledge of the changes in the total population of any community is most important. An intimate knowledge of the total population of all sections of a community is imperative. Accurate population data for small areas within a city must be obtained in order to calculate rates for various sections.

Variation of Tuberculosis Death Rates in Cleveland.

The tuberculosis death rate for the City of Cleveland is 82.5 per 100,000 population for 1930, but in order to lay plans intelligently for decreasing the incidence of the disease, the public health executive must know where the rate is 300 and where it is 30.

Variations in Tuberculosis Death Rates by Counties.

The state commissioner of public health, while cognizant of the fact that the rate for the entire state is 63.4, knows that it varies from county to county from 12.5 to 339.3 deaths per 100,000 population. He knows where the sore spots lie; one county has a rate of 339.3 and another county a rate of 150.3; while all of the other 86 counties have lower rates. Thus the site for concentrated effort is fixed.

Such data are even more useful for various parts of a metropolitan community, for the variations are larger between maximums and minimums, and the control measures may be exercised more easily within a relatively small and much more accessible area.

Sorting Data by Census Tracts from Street Addresses and Source of Population Data by Census Tracts

The geographical distribution of cases and of deaths in Cleveland was made possible in 1927 when a census tract street index* was published by the Cleveland Health Council. By means of this street index, addresses could be coded to the proper census tract at a rate of from 800 to 1,200 per day even by inexperienced clerks. The 1927 publication* also included the population of each census tract for 1910 and for 1920, the gross and net area, and the density per acre. In June, 1930** the provisional 1930 population figures were published, and in March, 1931***, the final data with a revised street index. The 1930 population for each of the 252 census tracts in Cleveland and the four largest adjacent cities, Lakewood, Cleveland Heights, East Cleveland and Shaker Heights, made possible the calculation of tuberculosis death rates for areas composed of multiples of census tracts.

Age Specific Tuberculosis Death Rates.

The age-specific death rates for tuberculosis vary enormously from 38.7 for those under 5 years, 14.6 from 5 to 9 and 9.1 for those 10 to 14 years, increasing to 61.6 for those 15 to 19 years and to 112.6 for those 20 to 24 years. With this in mind it is quite evident that rates for the entire population of each area would be expected to vary considerably unless the population of each of the areas had a uniform age distribution. The tuberculosis death rate based upon the total population of each group of census tracts was misleading because of these variations in age and sex composition.

Variations of Child Population Between Census Tracts Indicating Variation of Age Distribution Between Census Tracts

The detailed data for each census tract published this month**** show that while 26 per cent of the population of the five cities is under 15 years of age, in certain census tracts 1.5, 4.2, and 5.6 per cent were under 15 years of age; while in other census tracts 39.5, 39.8 and 40.0 per cent of the population were under 15 years of age. This variation is quite common. In 1920 the lowest percentage was in G-6, 4 per cent, the highest in U-5, 50 per cent. In 1910 the percentage varied from G-6, 9 per cent, to 0-7, 42 per cent.

*"An Analysis of Population Data by Census Tracts with Location Index," by Howard Whipple Green, a publication of the Cleveland Health Council, March, 1927.

**"Second Supplement to An Analysis of Population Data by Census Tracts with Location Index," by Howard Whipple Green, a publication of the Cleveland Health Council, June, 1930.

***"Population by Census Tracts Cleveland and Vicinity with Street Index," by Howard Whipple Green, a publication of the Cleveland Health Council, February, 1931.

****"Population Characteristics by Census Tracts, Cleveland, Ohio," by Howard Whipple Green for the Plain Dealer Publishing Company, December, 1931.

Variations in Age Distribution Necessitate Age Specific or Standardized Tuberculosis Death Rates

Thus, either age-specific tuberculosis death rates must be used for comparing one area with another, or tuberculosis death rates adjusted to a standard population. Sex is a factor in this picture, and in calculating rates variations in sex must be taken into account.

Age Specific Tuberculosis Death Rates Vary by Color.

The age-specific death rate 20 to 24 years for the Negro is normally greater than for the white and in the Cleveland five-city area in 1930, the rates were 663.8 and 70.1, respectively. Thus, adjusting the tuberculosis death rate for age is not enough, and white and Negro rates must also be calculated. It is thus necessary to know where the Negro lives, his number, sex and age.

Percentage of Population, Negro Varies by Census Tracts.

The Negro occupies one census tract to the extent of 90.6 per cent of the entire population. The percentage of the population of each census tract Negro varies from 90.6 per cent to no Negro population.

Certain Foreign White Stocks Show Peculiarities in Mortality.

Certain foreign white stocks show peculiarities and cognizance must be taken of the location of the foreign-born white by country of birth and native white of foreign or mixed parentage by country of birth of parents.

Variation in Infant Mortality Between the Five Cities.

Infant mortality in 1928 varied in Cleveland and the other four cities. Births and infant deaths having been adjusted to the place of residence of the mother, the rate for the five cities varied from 63.9 in Cleveland to 42.1 in Lakewood.

Since the infant mortality rate is calculated by dividing the number of infant deaths under 1 year of age by the number of births, the composition of the population by age and sex is unimportant, though color and stock are still important, and the economic condition of the population is extremely important.

Distribution of Census Tracts Into Fourteen Economic Areas.

The 252 census tracts have been divided into 14 economic groups based upon equivalent monthly rental figures, which take into account the value of owned homes and the monthly rental of rented homes. Those census tracts with equivalent monthly rentals $10.00 to $14.99 wherever they may be located, are considered as the lowest economic area.

Infant Mortality Varies by Economic Areas

The infant mortality rate in this low economic area was 110, in the next economic area, 87. The rate decreased to 26 in the highest economic area where the equivalent monthly rental of each census tract was $100.00 or over. Thus, one may see that the infant mortality rate varies with the economic condition of the population from 110 to 26.

Death Rate Adjusted to Standard Million Varies by Economic Areas

The death rate adjusted to a standard population for sex and age varies likewise from 15.0 for the two lowest economic areas combined, to 7.2 for the two highest economic areas combined. The decrease is rapid to the ninth economic area consisting of those census tracts which have equivalent monthly rentals between $50.00 and $54.99. The decrease is much less rapid as the higher economic areas are reached.

Fallacies in Birth Rates Necessitates Considering Age Specific Birth Rates Per 1,000 Married Women of Child Bearing Age

Birth rates based upon the total population are fallacious, for males, children and old people surely do not give birth to babies. Age specific birth rates per 1,000 married women should be calculated, for the variations are great, 397 per 1,000 married women 15-19*, 270, 20-24 years, 145, 25-34 years and 53 per 1,000 married women 35-44 years of age.

Birth Rates Per 1,000 Married Females 15 Years and Over and Per 1,000 Females, 15-44 Years Vary by Economic Areas

This degree of refinement on marital condition has not been obtained for the Cleveland publication**, but birth rates based on married females 15 years of age and over and based on total females 15-44 years of age have been calculated for each of the 14 economic areas. The lowest economic area shows 123 births per 1,000 married females 15 years of age and over, and the highest 51. The lowest economic area shows 93.9 births per 1,000 females 15-44 years of age and the highest 37.5. Both curves decrease rather rapidly to the eleventh economic area, and less rapidly thereafter.

Little is known regarding the variations of birth rates by color and nativity of mother, and unless age-specific birth rates per 1,000 married females are compared, nice refinements can not be employed. An unpublished study* made in 1929 showed very similar rates for the white and Negro, in fact, slightly lower age-specific married birth rates for the Negro.

*Refers to Ohio 1920 quoted from "Age Specific Birth Rates": Green, 1929.

**"Population Characteristics by Census Tracts, Cleveland, Ohio," edited by Howard Whipple Green for the Plain Dealer Publishing Company, December, 1931.

Illiteracy Varies by Economic Areas

The number of illiterate 10 years of age and over per 100 families is 53 in the lowest economic area decreasing to 2 in the ninth, and to 1 in the highest.

Jobless Varies by Economic Areas

While 4.07 per cent of the population of the five cities were "jobless" in April, 1930, 9.3 per cent of the gainful workers were jobless and there were 16.2 "jobless" per 100 families; (it must be remembered that there is an average of 1.74 gainful workers per family). The percentage of gainful workers "jobless" varies by economic areas from 24.2 in the lowest to 1.5 in the highest area and the jobless per 100 families varies from 44.6 in the lowest to 2.7 in the highest area.

Since the January, 1931, census was taken for Cleveland proper the April, 1930, data for Cleveland alone should be used in any comparisons. In 1930, Cleveland showed 4.6 per cent of the population jobless, 10.4 per cent of the gainful workers were jobless, and there were 18.6 per 100 families. The percentage jobless varied from 24.2 to 1.5 and the number of jobless per 100 families from 44.6 to 4.5 in the highest area, composed of the three highest economic areas.

In January, 1931, with 11.0 per cent of the population "jobless," as many as 25.2 per cent of the gainful workers were "jobless" and 44.9 per 100 families. The percentage of the gainful workers "jobless" varied by economic areas from 42.9 per cent in the lowest to 9.9 per cent in the highest, composed of the three highest economic areas and the number of jobless per 100 families varied from 78.9 to 14.9 in the highest economic area (composed of the three highest economic areas).

Citizenship of Foreign-Born White Varies by Economic Areas

A higher percentage of the foreign-born white population of the highest economic area are citizens of the United States, 65.7 than in the lowest economic area, 27.7.

Distribution of Family Heads Gives a Truer Picture of the Community Than Distribution of Population by Color and Nativity

The percentage of family heads, native white of native parentage, native white of foreign or mixed parentage, foreign-born white by country of birth, Negro, or of other races, is quite different from the percentage of the population in these classifications.

For example, 27.0 per cent of the population of Cleveland were native white of native parentage, 39.4 per cent native white of foreign or mixed parentage, and 25.5 per cent foreign-born white, but 22.5 per cent of the family heads were native white of native parentage,

24.2 per cent native white of foreign or mixed parentage, and 45.3 per cent foreign-born white. This is not difficult to understand when it is realized that some of the native white of native parentage are children in families with heads native white of foreign or mixed parentage, and many of the native white of foreign or mixed parentage are children in the families with foreign-born white heads. Less than 5.4 per cent of the foreign-born white population were under 21 years of age, while 54.4 per cent of the native white of foreign or mixed parentage, and 44.4 per cent of the native white of native parentage were under 21 years of age.

Even though the family heads in the five-city area may be said to be 26.9 per cent native white of native parentage, 25.3 per cent native white of foreign or mixed parentage, 41.1 per cent foreign-born white, and 6.5 per cent Negro, the percentage in each class in the 14 economic areas varies considerably.

Percentage of Family Heads by Color and Nativity Varies by Economic Areas

In the lowest economic area 1.5 per cent of the family heads are native white of native parentage, 9.3 per cent native white of foreign or mixed parentage, 87.7 per cent foreign-born white, and 1.2 per cent Negro; and in the highest economic area, the percentages are 54.5, 31.0, 14.1, and .4, respectively.

While 1.5 per cent of the family heads in the lowest economic area are native white of native parentage, this percentage increases rapidly in each succeeding higher economic area to 50.9 per cent in the tenth area; and increases slightly more as the economic area increases. A higher per cent, 9.3, of the family heads in the lowest economic area are native white of foreign or mixed parentage. This percentage increases rapidly in a similar manner to 31.8 in the ninth area and slowly to the highest area. The percentage of the family heads foreign-born white, 87.7 per cent in the lowest area, decreases rapidly but irregularly to 19.4 in the tenth area. This curve is straightened when the percentage of family heads Negro is considered, which is 1.2 per cent in the lowest area, increases to 23.0 per cent in the fifth area, and decreases to .2 per cent in the eleventh area. The curve for the foreign-born white and Negro combined is straight and pronounced. When various countries of birth are considered, similar curves are shown.

Substantiating Evidence That the 14 Economic Areas Represent Economic Differences

Someone probably wishes to raise the question: "Do economic areas constructed in this way reflect economic conditions?" A consideration

of the percentage of the families in each economic area having a radio shows 15.5 per cent in the lowest area, increasing rapidly to 73.3 in the ninth area and increasing more slowly to 87.4 in the highest area. While the radio data were collected by the Bureau of the Census, the resident telephones were distributed by census tracts for The Plain Dealer Publishing Company and the percentage of families in each economic area determined with the following results: 6.1 per cent in the lowest economic area increasing rapidly to 82.0 in the eleventh area and more slowly to the highest area with 99.5 per cent of the families having telephones.

The dip in the radio curve is probably caused by the large percentage of families living in apartments. The percentage of families living in three-or-more-family dwellings in each economic area shows large percentages in the ninth and tenth areas. The large percentages in the low areas are largely tenements and other dwellings in which three or more families live.

The percentage of families living in single dwellings varies from 16.4 in the lowest economic area to 83.0 in the highest; and the percentage of families owning their homes varies from 25.7 in the lowest to 75.9 in the highest.

Percentage Single by Color and Nativity Varies by Economic Areas

Age distribution can not be separated from sex distribution nor from nativity and race distribution and type of industry, marital condition and other factors are intimately mixed to make the picture. To illustrate the inter-relationship of these factors, the census tracts have been placed in array according to equivalent monthly rental and sufficient census tracts have been taken from the low end to make a population 103,918. Similarly census tracts have been taken from the high end to make up a similar population, 102,603.

The percentage of the females 15 years and over, single, in the low group is compared with the percentage single in the high group. These percentages differ but slightly, the percentage of these in the low group being 28 and of those in the high group, 32.

But when the percentage of the females 15 years and over single is qualified as being native white of native parentage, 41 per cent are recorded of those in the low group and 32 per cent of those in the high group.

If qualified as being native white of foreign or mixed parentage, 55 per cent are recorded of those in the low group and 33 per cent of those in the high.

If foreign-born white females are used only 7 per cent are single of those in the low group, but 28 per cent of those in the high group. Probably this difference is caused largely by resident servants, as this

difference is also evident for Negroes; 14 per cent of those in the low area and 38 per cent of those in the high area are single.

There are 2,182 foreign-born white single females 15 years of age and over in the high area and 306 Negro. There are 5,495 females in the high group recorded under type of industry as "other personal and domestic service" which is surely large enough to include all single foreign-born white and Negro females 15 years of age and over, as well as any of the excess of married foreign-born white and Negro females 15 years and over. 5,481 foreign-born white females, 15 years and over other than single minus 5,531 families with heads foreign-born white with no excess and 509 Negro females, 15 years and over other than single minus 105 families with heads Negro (or an excess of 404). Thus many females 15 years and over native white of foreign or mixed parentage and possibly some native white of native parentage are included in this interesting group.

The picture for the males 15 years of age and over is quite different; the greater percentage single in all cases being in the low group. For the total males, 39 per cent of those in the low group are single, and 26 per cent in the high. For the native white of native parentage, the percentages are 48 and 30; for the native white of foreign or mixed parentage, 69 and 27; for the foreign-born white, 19 and 11; and for the Negro, 32 and 16 per cent, respectively.

Size of Family

The size of the related family is significant in all studies of family economics. It is not surprising that four or five has been so frequently used as the average size of the family with so little data upon the size of the family available prior to the 1930 census.

The average size of the family group of 3.98 is decreased slightly to 3.90 for the average size of the "household" group when 670 quasi-family groups including 24,873 persons are excluded and to 3.7 when families consisting only of related persons are considered by excluding from the household, lodgers, resident servants, guests, foster children and wards. The medium size of the related family is 3.3 persons, thus half of the related families include less than 3.3 persons and half more than 3.3 persons.

The distribution of the size of the 270,424 related families in the five-city area shows 6.9 per cent consisting of but 1 person, 24.3 per cent of 2 persons, 22.2 per cent of 3 persons, 19.3 per cent of 4 persons, 12.2 per cent of 5 persons. 7.1 per cent of 6 persons, 3.8 per cent of 7 persons, 2.1 per cent of 8 persons, 1.1 per cent of 9 persons, 0.5 per cent of 10 persons, 0.3 per cent of 11 persons, and 0.2 per cent or 554 families of 12 or more persons.

The mode is the 2 person family, the median 3.3 persons and the average size 3.7 persons.

No average or median figure based upon the data for the entire community is applicable to all component parts of the community.

The average size of the related family in census tract G-6 is 1.6 persons and in census tracts G-1 and M-1, 2.2 persons; but in census tracts N-6, 0-7 and U-6 the average size of the related family is 4.8 persons, and in census tract T-3, 5.0 persons. In 10 census tracts the average size of the related family varies from 1.6 to 2.6 persons while in 10 census tracts at the other extreme the average size of the related family varies from 4.5 to 5.0. Thus it is evident that the average size of families in certain census tracts is quite different than it is in other census tracts.

The distribution of families by size in the lowest economic area is shown on the chart; the average size is 4.0 persons, and the median 3.7 persons. In the tenth economic area the average size is 3.0 persons and the median 2.7. In the twelfth economic area the average size is 3.3 persons and the median 3.1 persons. In the highest economic area there are 3.4 persons in the average family, 3.2 persons in the median family. The chart indicates a tendency to large families in the highest economic area. This may be due to related persons, not children. The age of the parents at marriage in these economic areas also affects the size of the family and further study is demanded.

The median size of the family varies as much as the average. The 10 census tracts with the smallest medians vary from under 1.3 to 2.1 and the next ten census tracts from 2.1 to 2.5. The ten census tracts with the largest medians vary from 4.3 to 4.7 and the next from 4.1 to 4.3.

The lodgers, resident servants, guests, foster children and wards living with the families and the population of those quasi-families classified as boarding and lodging houses or hotels make up 7.0 per cent of the total population, less the population included in such quasi-family groups as institutions, schools, etc., for the five-city area. This percentage varies from 0 in U-7 and CH-2 to 63.4 in census tract 1-4, 64.1 in census tract G-1, 67.0 in census tract I-1, 74.0 in census tract G-6, and 76.7 in census tract G-7.

In the ten census tracts with the lowest percentage of the normal population, lodgers, etc., the percentages vary from 0 to 1.7 and in the next ten lowest from 1.7 to 1.9.

The ten census tracts with the highest percentage vary from 34.6 to 76.7 and the next ten census tracts from 20.2 to 33.5. Census tract SH-2 is given as high a percentage as 21 because of the large number of resident servants. This census tract includes as many as 18 females classified in the other domestic and personal service type of industry per 100 population, thus substantiating this observation.

The number of lodgers, resident servants, guests, foster children and wards, unrelated persons, included in the natural family, i.e., in the

household, amounts to 23.1 per 100 families for the five-city area. These numbers vary from 0 in census tracts U-7 and CH-2 to 111 in L-7, 114 in H-1 and 167 in G-1. The ten census tracts with the lowest number per 100 families varies from 0 to 7 and the next ten census tracts from 7 to 8. The ten census tracts with the highest number vary from 77 to 167 and the next ten census tracts from 63 to 77. The enormous significance of such data will not be expounded nor the value of being able to state so definitely the magnitude of the unrelated family population living in households in various sections of the community.

The Common Succession Russian or Italian to Negro

A phenomenon commonly referred to in literature is well demonstrated by means of a study of census tracts in which the Negro and persons foreign-born in certain countries were enumerated during two decades. At three census periods it has been observed that there are a number of census tracts in which many Italians live and in which there are many Negroes.

In a census tract in the southeastern section of the city with little population, 1,557 in 1920, there were few Negroes, 10 or 1 per cent; few Italians, 238 or 15 per cent; and few persons born in Russia, 13 or 1 per cent. In 1930, however, the same census tract with 10,577 population in 2,282 families showed 314 or 3 per cent Negroes, 950 or 9 per cent born in Italy, and 1,209 or 11 per cent born in Russia. Thus, it is seen that this is a new Negro-Italian-Russian neighborhood. Census tract H-9, on the other hand, is an old area of this kind with 3,122 Negroes, 51 per cent; 202 born in Italy, 3 per cent; and 871 born in Russia, 14 per cent of the total population in 1920.

In the northeastern section in 1930 there is a census tract, Q-5, with 119,2 per cent of the population of 7,359, Negro, and 2,106 or 29 per cent born in Italy, but few, 15 persons, born in Russia. The Negro population in this census tract decreased between 1920 and 1930 from 225 or 4 per cent in 1920 to 119 or 2 per cent in 1930, while those born in Italy increased from 1,269 or 25 per cent in 1920 to 2,106 or 29 per cent in 1930.

A rather large area including a number of census tracts with a considerable Russian population in 1920 was entirely depopulated of Russians by 1930 due to an enormous increase of Negroes.

This area consisting of 11 census tracts included a population in 1920 of 61,986; 10,161 or 16.4 per cent were Negroes, 1,482 or 2.4 per cent were born in Italy, and 10,238 or 16.5 per cent were born in Russia. By 1930 these census tracts had decreased in population to 47,218, and 34,195 or 72.4 per cent were Negroes, 1,139 or 2.4 per cent were born in Italy, but only 609 or 1.3 were born in Russia.

In many census tracts in Cleveland, the Russian, the Italian, and

the Negro are closely associated. In each instance, the Negro forces the other two classes to move.

In 1920 census tract M-7 had a population of 4,512, 893 or 20 per cent of them had been born in Russia, and 393 were Negroes, the Negro population amounting to 8.7 per cent of the total population. In 1930, there are only 15 instead of 893 persons born in Russia and only 22 whose parents were born in Russia, but 3,150 or 90.6 per cent of the 1930 total population of this census tract were Negro. Your guess is as good as mine regarding the effect of this enormously increased Negro population on property values and on real estate loans.

Variations in Potential Voting Populations Between Census Tracts, and Reasons

The percentage of the population of the five cities 21 years of age and over who are native white of native parentage, native white of foreign or mixed parentage, Negro or naturalized foreign-born white amounts to 583,662 or 54 per cent of the entire population. This percentage varies from 81 to 74 per cent in the 10 census tracts with high percentages with franchise to 21 to 31 per cent in the 10 census tracts with low percentages with franchise. This enormous variation is accounted for in two ways: first, by the percentage of the population under 21 years of age which varies from 6 to 22 per cent in the former group to 45 to 54 per cent in the latter group; and, second, by the percentage of the population 21 years of age and over still alien which varies from 3 to 14 per cent in the former group to 18 to 28 per cent in the latter group.

The 10 census tracts with high percentages of adults with franchise have few minors and few alien adults, and are predominant native white of native parentage in nine cases and Negro in the tenth case.

The 10 census tracts with low percentages of adults with franchise have many minors and many alien adults. Polish stock predominates in five cases, Czechoslovak in two, Hungarian in two, and Yugoslav in one case.

With such definite information as to the available voters, the determination of to what extent these peoples have taken advantage of this privilege and how each stock has used this power should be determined. This is a challenge to the student in political economy.

Summary

The enormous importance of even a small part of the huge mass of data now made available by census tracts in Cleveland by the publication of "Population Characteristics by Census Tracts, Cleveland, Ohio, 1930"* soon to be made available in other census tract cities

*"Population Characteristics by Census Tracts, Cleveland, Ohio, 1930," edited by Howard Whipple Green for The Plain Dealer Publishing Company, December, 1931.

through other publications has been illustrated by some of the most striking examples of ways and means of applying some of the data and their significance. Thus, it is evident why the Cleveland Plain Dealer financed the publication; why this business organization during the past several years has made analyses of hundreds of thousands of sales of all sorts of commodities by census tracts thoroughly analyzing the Cleveland market; moreover, why all sorts of social and health data have been analyzed by the Cleveland Health Council and have served to provide the community with basic data. Social statisticians, political statisticians, financial statisticians, and certainly market analysts are already finding these basic population data of enormous value in the every day work at hand.

The effect of economic condition as reflected by monthly rental of rented homes and value of owned homes is seen to be enormous. Various sections of the community have entirely dissimilar characteristics, each with its own peculiarities. It is quite impossible to consider this five-city area as a single statistical unit but only as a combination of individual units. An average of the whole is grossly misleading.

Cleveland's metropolitan district is the third most densely populated of all the 94 metropolitan districts in the United States. It must be recognized as a compact community of 1,194,898 population, not a uniform community but a community consisting of communities each an entity bound together economically, if not politically, into a characteristic whole, probably the most statistically-minded of all American communities.

INCREASE AND DISTRIBUTION OF ELDERS IN OUR POPULATION

By P. K. Whelpton

As the title may suggest, an attempt will be made in this paper to describe and account for what has occurred as to the increase and distribution of elders in the population. A consideration of past events will provide a basis for indicating future possibilities, and for pointing out some of the more important effects that the rising proportion of elders may bring about.

Taking up first the growth of population in the older age periods as compared with the younger, the situation is found to be decidedly different in recent decades from what it was earlier in the nation's history. From 1800 to 1840 the percentage increase of persons past middle age barely equalled that of the total population, averaging about 33 per cent a decade in both cases. Since 1840, however, the growth of the older age periods has been more rapid than that of the total population, the differential varying from time to time. From 1840 to 1860 the differential between the group 70 or older and the total population was small, but that of the 50-70 age period was large. Since 1860 the rate of growth of the total population has been declining rather steadily, while rates for the older age periods have been maintained close to, or well above, the earlier levels, hence the differentials have been increasing. During the last decade the total population increased 16 per cent, whereas the 45-64 age period gained 26 per cent, the 65-74 age period 36 per cent and the 75 and over age period 30 per cent. This represents barely one-half the rate maintained prior to 1860 for the total population, but the age periods above 65 are still equalling or exceeding their former rates of growth, as is shown in Table I.

Looking at the matter from the standpoint of age distribution, the proportion of the population 45 or over remained nearly constant at 12 per cent from 1800 to 1840, and then rose to 15 per cent in 1870, 18 per cent in 1900 and 23 per cent in 1930. Taking smaller age periods, the proportion of the population aged 45-64 went from 12 per cent in 1870 to 14 per cent in 1900 and 17 per cent in 1930; and 65-74 age period increased from 2 per cent in 1870 to 3 per cent in 1900 and 4 per cent in 1930; and the 75 and over age period rose from .8 per cent in 1870 to 1.1 per cent in 1900 and 1.6 per cent in 1930. Summing up for the total population, the rate of growth for elders has been greater than that for younger age groups since 1840, with an increasing differential; and the proportion of elders in the population has also been going up at an increasing rate.

TABLE I
INCREASE OF ELDERS IN THE UNITED STATES

	1870	1890	1910	1930	1950[1]	1975[1]
			Population (thousands)			
0-19	19,158	28,875	38,634	47,645	47,000	45,000
20-44	13,643	23,115	35,933	47,059	57,000	58,000
45-64	4,603	8,209	13,449	21,431	31,000	41,000
65-74	829	1,716	2,798	4,724	8,000	13,000
75 & over	325	707	1,158	1,915	4,000	8,000
Total	38,558	62,622	91,972	122,775	147,000	165,000
			Percentage Age Distribution			
0-19	50	46	42	39	32	27
20-44	35	37	39	38	39	35
45-64	12	13	15	17	21	25
65-74	2	3	3	4	6	8
75 & over	1	1	1	2	2	5
Total	100	100	100	100	100	100
			Percentage Increase			
	1860-70	1880-90	1900-10	1920-30	1940-50[1]	1965-75[1]
0-19	19	20	14	11	–2	–2
20-44	22	28	25	16	10	–2
45-64	39	30	29	26	15	11
65-74	45	41	28	36	33	18
75 & over	42	41	29	30	33	33
Total	23	25	21	16	8	4

[1]The population after 1930 is estimated on the assumption that specific birth rates will become nearly stationary in 1970 at about 80 per cent of the 1930 level, that the expectation of life will rise to about 65 years in 1950 and 70 years in 1975, and that net immigration will amount to about 200,000 annually. It is believed these assumptions exaggerate the size of the future population and minimize the importance of the older age periods, particularly after 1950.

The situation of the chief race and nativity groups has been quite like that of the total population. Age data for Negroes in older age periods are inadequate before the 1850 census, but since that time the two races have shown a similar tendency to a more rapid gain of elders than youngsters. Considering native whites and foreign whites since 1870 (the first year for which census data are available) the increase of the older age periods has been greater than that of the total population for each group, though the differential has been somewhat larger for the foreign whites than the native whites. The proportion of elders has thus been going up more rapidly among foreign whites than native whites.

With these facts in mind as to the increase of elders in the population, attention will be turned to certain possible causes. Perhaps the causal factor that comes first to mind is a decrease in specific death rates of older people. The main sources of information regarding specific death rates are the Foudray[1] and Glover life tables,[2] which go back to 1901 for the Original Registration States and to 1890 for Massa-

[1] U. S. Bureau of the Census: "United States Abridged Life Tables, 1919-1920," prepared by Elbertie Foudray. Washington. Government Printing Office. 1923.

[2] U. S. Bureau of the Census: "United States Life Tables 1890, 1901, 1910 and 1901-1910," prepared by James W. Glover. Washington. Government Printing Office. 1921.

chusetts. These tables indicate that specific death rates of white males aged 45-84 and of white females aged 58-94 were higher in 1910 than in 1901, while 1920 rates were below those of 1910 at every age shown past 45, and in most cases were below the rate of 1901.[3] Other things being equal, these changes in specific death rates of elders would have caused the proportion of elders in the population to be lower in 1910 than in 1901 but higher in 1920 than in either 1901 or 1910, though the variations would have been so small as to have little significance. Data for Massachusetts only are available before 1901. The expectation of life at ages 50-70 is almost identical in the Wigglesworth life table for 1789,[4] the Elliott life table for 1855[5] and the Glover tables for 1890, but persons 70-90 had a higher expectation of life in 1789 than in either 1855 or 1890, though the 1890 figures were somewhat above those for 1855. Between 1890 and 1901 the Glover tables show a rise in specific death rates for males aged 58-88 and for females aged 52-88. It is impossible to say whether the trend in Massachusetts is representative of the United States, but it is probable that the decrease in specific death rates at older ages was an unimportant factor from 1850 to 1900, as it has been since 1900.

Looking into the future operation of this factor, it is doubtful if changes in specific death rates of elders will have any significant effect on their rate of growth during the next few decades. Sydenstricker is finding evidence of increasing mortality among elders in the United States, while specific rates for New Zealand, shown in the "Yearbook," have had an upward secular trend at ages 35-74 since 1925. In the United States and elsewhere certain diseases which affect middle-aged and older persons particularly, such as cancer and the so-called degenerative or break-down diseases, appear to be on the increase. It is possible that medical science will check these plagues eventually, but at the present time there is little indication of much progress within the near future.

While specific death rates of elders have shown little or no improvement, great gains have been made in lowering the mortality of infants and children. Since the number of persons past 45 at any time depends to quite an extent on the death rates of persons under 45 during several preceding decades, it is evident that this prevention of deaths at younger ages may have had an important effect in bringing

[3] The influenza epidemic caused the death in 1918 of many persons who would otherwise have died in 1919 or 1920 in the ordinary course of events, hence specific rates based on actual deaths in 1919 and 1920 probably are somewhat too low.

[4] American Academy of Arts and Sciences: "Memoirs." Vol. II, pt. 1. Boston. Thomas and Andrews. 1793. *See* pp. 131-35. The high expectations of life for persons past 50 in these tables are obtained in spite of an error in method, which apparently makes specific death rates too high at every age.

[5] American Association for the Advancement of Science: "Proceedings. Eleventh Meeting. Held at Montreal, Canada East. August, 1857." Cambridge. Joseph Lovering. 1858. *See* pp. 51-82.

about the increase in elders. Nearly all persons 45 or older in 1930 were born between 1830 and 1885, while those 45 or older in 1870 were born between 1770 and 1825. Any greater chance of survival from birth to the age of 45 for the babies of 1830 to 1885 than for those of 1770 to 1825 would exert a corresponding influence to raise the proportion of elders in 1930 above the 1870 level. According to the Wigglesworth[1] and Elliott[2] life tables, specific death rates per thousand in 1789 and 1855 were as follows: age 0, 259 and 155; age 1, 76 and 85; age 5-9, 16 and 8; age 15-19, 16 and 9; age 25-29, 18 and 12; age 35-39, 20 and 12. Although the death rates of the Wigglesworth tables are too high because of an error in method of construction, the death rates just given are so much lower for 1855 than for 1789 that the proportion of newborn babies living to age 45 probably rose during this period.

Far more important, however, than the change in death rates as a cause of the large increase of elders is the change in the number of births and in the birth rate. The elders of any period are the survivors from births that occurred over fifty years previously. A rapid increase in the number of elders from 1870 to 1930, therefore, means that in some past interval, probably about 1770 to 1865, there was a rapid increase in the number of births or in the rate of survival. The change in death rates, the complement of survival rates, has been shown to have been small; the change in the number of births now needs consideration. The best measure of births is the number of children under 5 enumerated at various census dates, which rose from about 1,000,000 in 1800 to nearly 5,000,000 in 1860. Part of this gain, of course, was due to the decrease in infant and child mortality, previously mentioned, but the bulk of it unquestionably came from a greater number of births. Looking into the future, however, there are indications of a decline in the number of elders in the neighborhood of 2000 A.D., since there were only 13,000,000 births during 1925 to 1929 compared with 14,200,000 during 1920 to 1924,[1] and the straight line secular trend of births from 1910 to 1930, inclusive, has a downward movement of nearly 6,000 per year.[2]

While the main factor in causing a rapid increase in the number of elders has been a rising number of births several decades earlier, the increase in the proportion of the population in the older age groups has been caused principally by the rapid decline in specific birth rates. Vital statisticians know that the continuation of given specific birth and death rates, in the absence of migration, results eventually in a stabi-

[1] *Loc. cit.*

[2] *Loc. cit.*

[1] P. K. Whelpton: "Trends in Population Increase and Distribution During 1920 to 1930." In *American Journal of Sociology*. Vol. XXXVI, No. 6 (May 1931).

[2] Mimeographed table, issued by the Scripps Foundation for Research in Population Problems. Oxford, Ohio.

lized rate of increase of the total population and of each age group; and also in a constant age distribution of population.[3] A change in either birth rates or death rates, however, causes a change in the rate of natural increase and in age distribution, while if both birth rates and death rate change (as they ordinarily do from year to year) natural increase and age distribution are affected unless the changes happen to be compensating, which is possible theoretically but not probable.

In spite of the increase in the number of births in past years, the birth rate has been declining ever since 1810, as is shown by the ratio of children to women. In 1810 there were 976 children under 5 years of age per thousand women aged 16-44 but in 1930 only 408, a decline of about 60 per cent, which was broken only in 1860, and then but slightly.[1] Among the white population the decrease was quite similar, being from 1,006 in 1810 to 402 in 1930.[2] While the ratio of children to women is the best available measure of the birth rate over several decades, it understates the fall in the birth rate because of the decline in infant mortality that has occurred. With such a decline in the ratio of children to women the additions to the younger age groups have become decidedly smaller relatively. This has lowered the proportion which children and young people constitute of the total population and hence has increased the proportion to be found in the older age periods. Since there are few indications that the decline in the birth rate has been checked—the decrease of over 25 per cent during the last decade having been one of the largest—it is safe to expect the proportion of elders to continue to increase for many years.

The above discussion of birth and death rates applies strictly to the native born population, emigration having been so small that it may .be disregarded. For the foreign born group, however, immigration must be considered as well as births and deaths. If the net admission of immigrants at each age period each year bore a constant relation to the number already in the country and specific death rates were unchanged, the age composition of the foreign born would become stabilized. However, the net arrival of foreign born has varied greatly from decade to decade, the peaks of immigration having come in the eighties and in the pre-war period from 1905 to 1914. Since most immigrants are young adults, the tendency is for the rate of increase of elders among the foreign born to rise twenty to fifty years after a period of rapid increase in immigration, and for the proportion in the older age groups to increase when a period of little immigration

[3] *See* Louis I. Dublin and Alfred J. Lotka: "On the True Rate of Natural Increase." In *Journal of the American Statistical Association.* Vol. XX (September 1925).

[1] Walter F. Willcox: "The Change in the Proportion of Children in the United States and in the Birth Rate in France During the Nineteenth Century." In *Publications of the American Statistical Association.* Vol. XII, n. s. No. 93 (March 1911), pp. 490-499.

[2] P. K. Whelpton: "Industrial Development and Population Growth." In *Social Forces.* Vol. VI, Nos. 3-4 (March-June 1928), pp. 458-467; 629-638.

follows one of heavy movement. The large immigration in past years is now causing a high rate of increase of elders, while the greatly restricted immigration since 1914 is keeping down the proportion of younger people and thus is helping to raise rapidly the proportion in the older age groups.

These facts regarding the increase of elders during past decades and the factors responsible for the trend provide a background for considering estimates of what may be expected in the future. The Scripps Foundation has calculated what the population of the United States will be each year up to 1975, using different estimates of future specific birth and death rates. With death rates, however, little variation has been made from an expectation of life of 65 years by 1950 and of 70 years in 1975, standards that seem reasonable from past trends in the United States and from the present situation in Australia and New Zealand. An average net immigration of about 200,000 per year (the 1926 to 1930 level) has been used in every case, since there seemed too little basis for forecasting changes which will be brought about by the future action of the legislators and executive officials who enact and administer the immigration laws. While there may be an equally inadequate basis for estimating future specific birth rates, it is believed that variations in them will have the most important influence on the growth of population in the future, as has been the case in much of the past. In any event, the value of the results is not so much in indicating what the population actually will be at a given future date as in showing the situation that will exist if certain trends in birth rates and death rates which now seem reasonable are followed.

The most optimistic assumption regarding future specific birth rates that seems at all likely of being fulfilled is that they will remain at the present level. If this occurs, the rate of increase of elders will continue above that of the total population for several decades, and the proportion of the population who are elders will keep on rising for a time, though eventually becoming stabilized. A more reasonable assumption regarding birth rates, though still on the optimistic side, is that the decline of over 25 per cent in the birth rate to women aged 20-44 which occurred from 1920 to 1930 will not be repeated, future decreases becoming smaller until the birth rate becomes stabilized at about 80 per cent of its recent value. Figures for 1950 and 1975 in Table I have been obtained on this basis. As is shown there, the population may amount to about 147,000,000 in 1950, an increase of 20 per cent over 1930, while persons over 75 will double in numbers, those 65-74 will increase by 70 per cent and those 45-64 by nearly 50 per cent. In the two older age periods these rates are well above those for 1910 to 1930 but the reverse is true for the 45-64 age period. From 1950 to 1975 the increase of elders will be still more striking on these assumptions of population growth. While the total population may gain 12 per cent during this

later period, persons 75 and over again will double in numbers, those 65-74 will increase by one-half, and those 45-64 by one-third. The rapid rise in the number of elders indicated by these estimates is due almost entirely to increases that occurred in past years in the number of births, since immigration is assumed to be small and specific death rates past middle life to decline but little. If medical science is successful in its efforts to lower greatly the death rate in this group, the relative increase will be larger than shown here. Of course, a larger decline of future birth rates than has just been assumed would not affect these rates of growth for elders, since all persons who will be over 45 in 1975 are now living. It would lower the rate of growth for the total population, however, thus increasing the differential between rates for the older and younger age groups.

With the rate of increase of elders being well above that of the total population, the proportion of persons in the older age groups will go up rapidly. This will be the joint result of the increased births in past years just pointed out, together with the continuation of the greater decline in specific birth rates than in specific death rates, which appears so probable. As is shown in Table I, the proportion of persons 75 and over, which was 1.6 in 1930, will become 2.4 in 1950 and 5.0 in 1975. The proportion of persons 65-74 will increase from 4 per cent in 1930 to 6 per cent in 1950 and 8 per cent in 1975, while the percentages for the 45-64 age period will be 17, 21 and 25. Since it is probable that specific birth rates will not stop declining at an average of 80 per cent of the recent level, the increase in the proportion of elders may be expected to exceed the figures just given.

Taking up the distribution of elders, several factors which work at cross purposes make the situation appear somewhat muddled at first. After some disentangling, however, it appears that the proportion of elders tends to be higher in older settled states than in newer, in states having a low rate of increase than in those growing rapidly, in agricultural areas than in industrial areas, and in small cities than in large. The first two relationships are largely explainable by what has previously been said of birth and death rates in past decades. The last two can really be combined, the proportion of elders in the population increasing fairly steadily from a low point in large cities to a high point in rural areas, though there is little change in passing from cities of 500,000 to those of 25,000. These explanations hold for several decades.

Previous to 1920 there have not been adequate data for studying the age composition of the smaller villages, or of the farm population. In 1920 and 1930, however, the non-farm rural group has a proportion of elders considerably higher than that of any other group. If this non-farm rural group were further subdivided into the older villages and the new acre-lot colonies of city workers that are springing up along paved

roads near industrial centers, the village group would no doubt have much the higher proportion of elders.

Although small cities, villages and farms have had much more than their share of older persons for several decades, a gradual trend toward equalization has been going on among the white population. In 1910,[1] the proportion of white persons in large cities who were 65 or older was barely two-thirds that of rural communities, but in 1930 it had risen to nearly three-fourths. Perhaps the great exodus from the farm has gone on so long that a larger and larger number of people are growing old in cities with no ties back to the country sufficiently strong to provide a quiet haven in old age. Or perhaps the large city now has a stronger appeal to more elders, so that few wish to leave it before death.

With Negroes, the situation has been the opposite. The movement of Negroes to the cities since 1915 has been so much larger than previously and made up of young adults to such a great extent that the proportion of the Negroes living in large cities who are 65 or over has declined from 1910 to 1930. In a few more decades, however, this should be reversed, and the present trend of the white population be followed.

Since papers are to follow dealing with employment of older persons, the retired school teacher and old age pensions, these matters will not be emphasized here. It may be mentioned in passing that employment policies that are adapted to a situation where 31 per cent of persons in the working ages 20-64 are between 45-64 will not work so well when 41 per cent are in these older age brackets, as will probably occur before 1975. Similarly, the burden of retirement pensions or of old age pensions is one matter when 5.5 per cent of the population are past 65, as in 1930, but it may weigh much more heavily when the proportion reaches 13.0 per cent, as is likely by the time the youngest persons here are old enough to be on the pension roll.

The effect of the increasing proportion of elders on the problem of dependency is one that hinges in large measure on the extent to which persons can continue at productive work after they pass the best working ages. The large gain in the proportion of the population in the older age groups is at the expense of the younger age groups, as has been indicated, the 20-49 age period changing but little. There will be less children to be looked after and supported, but more older people, and because of smaller families there will be fewer brothers and sisters to share in caring for their aged parents. If persons 15-19 and 50-69 can be classed as only self-supporting and those under 15 and 70 or over as dependents who must be supported by producers 20-49, the ratio of dependents to producers is found to have declined from 869 per thousand in 1900 to 744 per thousand in 1930; and under the assumptions previ-

[1] The age composition of the rural population is not given by the census between 1840 and 1910.

ously noted as to future population growth, the ratio of dependents to producers 20-49 will be 641 per thousand in 1950 and 684 per thousand in 1975. For the next few decades, therefore, the increasing proportion of elders will be more than offset by the decreasing proportion of youngsters. If persons between 50 and 70 are not forced into dependency, the load on the best working ages will be considerably lighter than at present. On the other hand, if employment difficulties of persons past middle age follow a decidedly upward trend in the future, their support will fall more heavily on young adults. The reaction of this group is likely to be a greater increase in contraception, a more rapid decline in the birth rate and hence a greater increase in the proportion of elders than has been assumed in this discussion.

Since it is rather generally agreed that conservatism increases after middle life, it may be expected that the United States will become a more conservative nation as the proportion of elders in the population increases. This may show its effects in several ways. In industry it is probable that elders will become increasingly numerous among executive officers and on boards of directors. This may mean a greater desire to play safe in industrial management, which may be reflected by a lessened desire to try out new methods, and to replace old processes with new if there is only a gambling chance for lower costs and larger profits. The extent to which our mechanical efficiency has been due to the large number of youngsters in positions of control cannot be measured exactly, but it is possible that this condition has had much weight. It will be important to see that a gradual replacing of youth by age does not involve sacrifice in this matter.

In the present depression, much is being said about the low state of economic or social efficiency in industry as distinguished from its high mechanical efficiency. If the group now in control does not prepare and carry out some program to improve this situation, many thinkers may welcome greater concentration of control in the hands of elders on the theory that we are now paying the penalty for the unchecked boom due to the exuberant speculations of youthful executives up to 1929. But on the other hand, the explanation for our present situation which has perhaps the most weight back of it, is that too much of the profits of good years were used to expand plant capacity rather than to increase wages, so that buying power could not keep up with production. If this diagnosis is correct the remedy will be more pay for less work, which may be more objectionable to older business executives than to younger, due to a difference in the number of working years spent under the old régime.

In the field of government, too, the greater concentration of population in the older age groups may make for more conservatism. The average age of voters will be higher and presumably congressmen and other elected officers will be chosen to a greater extent from the group of elders. The claim of vested interests probably has a greater appeal

as age increases, hence an increase in the number of elders in legislative and executive positions may be expected to result in more considerate treatment of such interests. Whether our monetary policy will be affected is a question that might also be raised. Older people tend to have the bond-holders' point of view and to prefer a period of falling prices; whereas the more aggressive and usually the younger entrepreneur desires a period of rising prices. The upward movement in average age of officials and voters may strengthen the dear-money group and weaken the cheap-money forces. However, this influence on monetary policy may tend to be offset by any greater assumption of control of industry by elders, which was previously pointed out as likely to occur. Another effect of increasing age of voters and officials may be greater friendliness toward legislation regarding old age pensions.

As for consumption, the change in age composition will have widespread effects, since demands and tastes for such a wide range of products are affected in some degree by age. A few possibilities may be mentioned briefly. In the matter of food, older people usually require less than younger ones and have to be more careful of their diet. This may have some tendency to make the farm problem more serious while benefiting those engaged in producing health foods and tonics. With clothing, the increase of elders may be felt both in style and quantity. Wear and tear of clothing decreases with age, on the whole; while up-to-the-minute style is usually less important after middle age than before. Considering real estate, older people who are self-supporting seem to prefer apartment houses or family hotels to separate houses, partly to be relieved of caring for furnaces and other responsibilities. This requires less land and permits greater concentration of population. With public buildings, homes for the aged may become more numerous and schools less so. Since recreation habits differ considerably with age, dancing and auto speeding may lose out somewhat to talkies, radios and good books. But mentioning these possible effects of age on consumption habits barely scratches the field.

Many other effects of the rapid increase in elders come to mind with a little reflection. In the field of vital statistics there will be a rise in the general or crude death rate as the population becomes older, in spite of decreases in specific death rates which will lengthen the expectation of life at birth. But now it is more desirable to summarize what has been said than to bring up more effects of the increase in elders. Briefly, (1) the factors that have been causing the older age periods to increase more rapidly than the total population in the past will cause a still greater differential for several decades in the future, (2) farms and villages will provide fewer havens for old age, and cities will be forced to carry more of the burden, and (3) the change in age composition will have many effects on the economic, political and social life of the nation. It is important that attention be directed to all these matters in the hope that programs may be worked out that will be adapted to the new conditions.

THE EMPLOYMENT OF THE OLDER WORKER—THE ECONOMICALLY MIDDLE AGED AND AGED[1]

By Solomon Barkin

Just as the welfare of women and children employed in industry commanded the interest of the American public for several decades, so has the economic position of the older person during the last several years come to engage an ever growing concern for their well-being. Evidence to this effect is mounting. An increasing number of publications are being devoted to their cause. In addition, legislation for the relief of one type of older worker, the dependent aged, has been enacted by some 17 states. Finally, there is the extensive investigation now being conducted by the New York State Commission on Old Age Security on the age factor in industry. This study has arisen out of the desire of labor and employers to ascertain the actual state of affairs in industry with regard to the employment of the older person. The source of this fear for the older worker can be traced to several factors. In the first place, the last census has confirmed the predictions of an aging population. Secondly, there has been a wide acceptance of the conclusion that the older wage earners have been among the worst sufferers of our stupendous technological and industrial changes. Thirdly, unemployment, it has been observed, has reduced many of them to unemployable persons. Finally, there is the evidence pointing to the existence of discriminatory maximum hiring age practices in industry. The above conditions and observations have led men to inquire whether a larger number of older persons were to become dependent and, finally, whether there was not some method of overcoming the employment barriers and reabsorbing the older worker into industry, so as to permit as large a group of them as possible to become partially, if not entirely, self-supporting. It is the purpose of this address to describe the nature of the difficulties of the older worker, suggest the size of the problem, and outline a possible program of remedial action.

Who Are the Older Workers?

An appreciation of the problem of the older worker must rest on the recognition that not all older persons are necessarily at a disadvantage in their efforts to maintain their jobs or to seek new opportunities for employment. On the contrary, numbers of older persons are securely placed. Many find their powers well attuned to their occupation and

[1] Copies of the basic statistical tables may be obtained by addressing the author, care of the American Statistical Association. The numbers enclosed within parenthesis indicate the numbers of the tables.

are able to preserve their full usefulness despite their advancing age. This is particularly true of executives, supervisors, and numbers of highly skilled and responsible employees in production departments.

Though there are some who escape the employment handicaps which accompany age, there are many older persons who do not. The latter find themselves sharply circumscribed in their efforts to eke out a living. Among the older age groups may be found two distinct types of employment handicapped, the economically middle aged and the economically aged. The first, as its counterpart in the physical life, dates the inception of the decline of an individual's economic full usefulness, and the latter symbolizes the culmination of the process. It must be said, that the determination of the age of the beginning and completion of this decline is within the province of the employer who acts as judge and bases his calculations on pecuniary standards. His decision, made consciously or unconsciously, is usually based on a consideration of the wage and capital investment per unit of product, the employee's benefit obligations, the personnel policy governing promotions and types of employees desired, and the employee's regularity of attendance, accident and sickness record, quality of work, and skills and knowlege. Actual productivity is a singularly important factor but not the sole concern. It is, therefore, evident that those who are classed by management as having passed their peak of economic usefulness, the economically middle aged, may consist of three classes of workers: first, those whose working capacity has actually begun to decline from the peak attained during their maturity but are distinctly employable and who are employed; second, the workers whose productivity has begun to decline and are unemployed; and, third, those whose working capacity and usefulness is fully available but whose age has prevented their being easily reabsorbed into employment. The personnel policies of industrial concernes within their field of employment have prescribed against hiring persons past a given maximum age limit. Outside of the realm of industry are the economically aged who consist either of the partially employable, those who cannot find gainful employment in industry open to them but are capable of being engaged at some well adjusted occupations, or workers who are entirely unemployable.

When Is Economic Middle and Old Age Attained

However much we may desire to know when economical middle and old age begin, and how large a proportion of the older population may be found in these employment handicapped groups, it must be confessed that our available data is suggestive rather than conclusive. Our first indications of the age of the inception of economic middle age for our industrial population are the maximum hiring age policies of industry. Many establishments maintain such policies either as formally adopted rules, tacit understandings, or unformulated practices. The

replies of employers in two New York State industries: the steam railroad repair shops, and the machinery manufacture, indicate that the preponderant proportion of the employers either barred older persons entirely or exercised special care in hiring them.[1] The age at which the bar is placed is sometimes as low as 35 years, though customarily, the age is either 40 or 45 for men. In the more highly skilled trades, the age is somewhat higher. Persons who have passed the age limits of the specific jobs, or of the establishment as a whole, cannot obtain employment in these concerns unless the approval of either a high executive or the board of directors is obtained.

Additional indications of the age of the decline in working capacity are the available data on the age of the partial impairment of earning power, and the actual earnings of persons during different age periods. A Pennsylvania study made in 1919 concluded that some persons had their earnings impaired before they had reached 40 years (8 per cent of the cases), particularly railroad workers. By the time these wage earners had attained the age of 55, more than half of the workers engaged in the steel industry, at various skilled trades, on the railroads, and as glass blowers had undergone a partial earning impairment. More than 84 per cent of all of these workers had experienced wage cuts by the time they had reached the age of 65. Two other studies have examined the same phenomenon, but their results are not strictly comparable with those of the Pennsylvania study.[2] These surveys have set the average age of partial impairment within the age group of 65-69 years. (2)

Testimony which is available on the actual earnings of industrial workers from various sources seems to support the findings of the former rather than the latter studies. All of the available data on earnings reveal that a decline is affected in the actual earnings and wage rates received by workers employed in industry within the age group 40-49 and, in some industries, the decline is evident earlier. (3) Another study which analyzed wage methods and selling costs in hosiery and ready-to-wear departments of department stores has concluded that "hosiery clerks become more efficient as they grow up to 35 years of age, and then become less efficient," while "the ready-to-wear clerks increase in value to the store from 30 years of age up to 55

[1] The New York Commission on Old Age Security will shortly publish studies on this subject. See also California, Department of Industrial Relations, Middle Aged and Older Workers in California, 1930.

[2] The information was based on a sample which was less industrialized, more generally engaged in the lighter manufacturing industries, and contained a scattering of proprietors and workers on own account, and consisted only of persons who were 65 years or over. (Massachusetts Report on Old Age Pensions, 1925, pp. 60-70; National Civic Federation, Extent of Old Age Dependency, 1928, p. 55.) The Pennsylvania study, on the other hand, was made on the basis of a highly industrialized group and included persons 50 years and over. (Report of the Pennsylvania Commission on Old Age Pensions, 1919, pp. 104-6.)

years."[1] A survey of the distribution of three metal machine manufacturing industries in New York State makes it apparent that there is a rather distinct decline in the number of male workers employed in industry after the 40's had been attained. (4)

The increase in the percentage of unemployment among those in the older age groups, as well as the longer periods of unemployment, speak strongly of the relative economic insecurity of the worker past 40 or 45 years. A survey of the unemployment returns made by the United States Census for the state of Delaware reveals that there is a higher incidence of idleness among men past 45 years than among younger men.[2] The testimony of the Buffalo unemployment census permits one to infer the same conclusion.[3] However, since the above studies included within their figures a large proportion of the nonwage-earning population, and since it is questionable whether unemployment, in the strict sense of the word, is at all possible among nonwage-earners, it may be expected that the age when the increasing incidence of unemployment commences would be much younger in the industrial population. This conclusion is borne out by the results of the investigation in the city of New Haven, which used as the basis for its calculations the normal full-time industrial workers rather than all the gainfully employed. In this study, the rate of unemployment increased after the age of 40 years rather than 45.[4] (5) Not only the rate of idleness but also its severity rises with advancing age. The Buffalo survey reveals that the severity of idleness increases with the age group 35-39 years, while the New Haven analysis suggests the severity increases during the 40-44 age period. (6)

Further testimony pointing to the handicaps of the man past the 40's in the labor market is available in the study of some 370 displaced clothing cutters. The time lost by the cutters before securing regular employment increased after the age of 40, and more than 90 per cent of the persons 45 years and over experienced reductions in earnings at their new jobs while the younger men generally showed increased earnings.[5] A similar tendency is revealed in a study of another group of displaced workers—rubber factory employees. The number of workers past 45 years who found work within three months after the layoff was 43 per cent, while the per cent for those under 45 years was

[1] Bezanson, Anne and Hussey, Miriam. Wage Methods and Selling Costs in Four Major Departments, p. 27.

[2] The Delaware survey was the only completed semi-industrial state available at the time of the survey.

[3] State of New York, Department of Labor, Special Bulletin No. 167, Unemployment in Buffalo, November 1930.

[4] Margaret H. Hogg, Work Shortage in New Haven, May-June 1931 (unpublished). Russell Sage Foundation.

[5] R. J. Meyers, Occupational Readjustment of Displaced Skilled Workers, Journal of Political Economy, August, 1929, pp. 473-490.

71. Furthermore, of the 28 workers who failed entirely to find employment, 22 were 45 years and over.[3]

Though the decline in industrial position does not affect all classes of the industrial population alike, there is sufficient evidence available to conclude definitely that there is a very general change for the worse in the position and earning powers of male industrial workers during the period from 40 to 50 years. Customarily, economic middle age is attained earlier by the unemployed than those actually employed with a concern. The expressions of these changes are manifold. Often it is revealed in the actual decline in productivity; at other times, in the change to a job of a lower income class, discharge when new methods of production are introduced, less regular work, longer periods of unemployment, and in decreased wage rates and actual earnings. The break in the peak of productivity and earning capacity is produced by the diminution in working capacity, but the age of the decline is often lowered by industrial hiring and separation practices.

Though it has been possible to define the ages during which a considerable proportion of the industrial population evinces definite indications of a decline in economic full usefulness, it is hazardous to estimate the size of this class. Large numbers of the economically middle aged are employed at tasks suited to their decreased capacity. No data is available to indicate the extent of this adjustment. However, it is important to note that unemployment and general idleness is particularly aggravated in the older age groups. It may be said that in the state of Delaware, advanced age constituted an employment handicap in the labor market to the extent of 28 per cent, and in New Haven of 54 per cent over the age groups with the lowest percentage of unemployment.[1]

With regard to the inception of economic old age among the industrial population, there is even a greater amount of agreement. In the first place, there are the pension plans which generally provide that their members may be retired between the ages of 60 and 70. Some of them designate an earlier age for women, and special hazardous occupations. The largest number of the plans tend to set the age of retirement close to the 70 year age mark rather than to the 60 years. When it is remembered that the purpose of most of the pension plans is to maintain an active and capable force, and eliminate in a humane manner those who encumber the organization, it may be realized that these ages represent the maximum age of usefulness in the ordinary industrial organization.

The studies which have been referred to above in connection with the ages when partial impairment of earnings takes place, likewise of-

[3] New Haven Study by Clague, Ewan and Coupler, W. J. The Readjustment of Workers Displaced by Plant Shutdowns. The Quarterly Journal of Economics, February, 1931, pp. 326-327.

[1] In Delaware, the age group 40-44; and in New Haven, the age group 35-39.

fer us suggestions concerning the ages when total impairment of earning capacity is experienced. The Pennsylvania investigation reveals that more than 62 per cent of the persons reported upon had experienced total impairment before they had reached 65 years. By the age of 70, more than three-quarters had completely lost their earning powers. In the Massachusetts study, more than 50 per cent could claim no earning power by the time they had attained 70 years. In the National Civic Federation study, the percentage was 81, and in that respect it resembled the results of the Pennsylvania investigation. (7) Furthermore, there is a very discernible increase in the percentage of the nongainfully employed among men after the age of 60 years. The United States Census for the state of Delaware reports that the percentage of nongainfully employed is 5.8 per cent for the age group 55-59 years, 12:3 per cent for the age group 60-64, and 39.1 per cent for those 65 years and over. These findings are borne out by the other studies of unemployment which have been made independently of the United States Census. (8) We may refer to the precipitous drop in the percentage of persons 60 years and over actually engaged in the three metal manufacturing industries in New York State. (4) It may, therefore, be said that economic old age does, in many cases, begin in the 50's, particularly because of sickness, accidents, or physical exhaustion. However, the largest number experience this stage in their economic cycle during the seventh decade, particularly during the latter part. No estimate can at this time be hazarded as to the size of the group. It must, however, be further observed that available studies make evident the fact that at least 20 per cent of the group can engage in light work of one type or another.[1]

Though no estimates can be presented, the fact that a significant proportion of the industrial population undergoes a decline in their competitive powers in the employment market, experiences longer periods of unemployment, encounters increased difficulties in their efforts to be reabsorbed, and faces reductions in their earnings during the fifth and early sixth decades, speaks of the significance of the middle aged and aged worker problem. In view of the fact that the male population 45 years of age and over constitutes 33 per cent of the total male population 15 years and over, assures us further that this question cannot be dwarfed by neglect.

Plan of Action

The staggering size of the problem of the older worker and its seriousness demand a comprehensive program of action. It must be directed toward the extensive employment of available labor power and the avoidance of a large community relief burden. To accomplish this

[1] Massachusetts, op. cit. p. 60.

goal, we must first adopt a plan envisaging the distribution of financial relief and the establishment of adequate hospital and institutional provision for the unemployable dependent persons irrespective of age. Contributory pension systems must be developed to prevent dependency and enable persons to retire from active working life by reason of physical disabilities and age. For the economically aged who are partially employable, there should be developed sheltered industries and workshops as well as special employment agencies adapted to their needs. Facilities for rehabilitation, physical, mental and vocational, should be made widely available. To erase all indiscriminate firing of older employees and assist them in their efforts to obtain well adapted employments, legislation should be adopted providing for the compulsory payment of bonuses by industry to dismissed older employees. These dismissal bonuses should be graduated by age and period of service. To meet the problems of the economically middle aged, industry must openly avow its acceptance of the principle of preference for the economically middle aged for jobs at which they can be profitably employed, make intensive job studies to reveal possible openings for the older worker, develop a plan of employment adjustment, relax its discriminatory maximum hiring age policies, formulate the qualifications of new employees in terms of the specific jobs to be filled, and assume its share of the older worker population. It is of the utmost importance for industry to recognize and adopt these principles at the present time so as to pemit them to govern the process of reabsorption of the unemployed. If industry voluntarily fails to enforce these measures, legislation may prove to be the most desirable lever to bring about an increase in number of employed older men. Governmental agencies must come to the aid of industry by extending the numbers of employment offices, and making them both adequate in number and personnel to answer the needs of the localities which they serve, and by assisting in the development of job studies, and in the formulation and popularization of plans for the employment adjustment of the older worker. These facilities offered by the state or regional labor department should be supplemented by the expansion of welfare services, the development of contributory pension systems and dismissal wage plans for the older worker who is laid off. This double program of public and private endeavor must generally be applied, otherwise the condition of the older worker as well as other employment handicapped groups will become more aggravated.

THE STATUS OF THE RETIRED TEACHER[1]

By ILSE M. SMITH

In a discussion of provisions made for old age security of employed groups, the following questions will arise: 1. What measures have been taken to assure members of these groups some degree of financial independence in old age? 2. What are the needs or living costs of aged persons? 3. How far have these needs been met by established measures? This paper will present some information in answer to these questions, with reference to teachers in public elementary and secondary schools.

A. Types of Assistance Provided Teachers.

1. *Retirement or pension systems.*—The most generally-adopted measure has been the formally-organized retirement or pension systems for teachers, administered by state or local governmental units. About sixty per cent of the active teaching force in the public elementary and secondary schools is covered by retirement provisions. State-wide retirement systems have been established for teachers in 22 states. At least 57 local communities have inaugurated teacher retirement plans. A preliminary report from 22 state and local systems shows at least 8,000 to have been retired on allowances for superannuation or service from these systems.[2]

These retirement systems differ widely in general organization and character of benefits provided. Devised primarily for the administrative and instructional staff of the public schools, in a few cases membership includes uncertificated employees and the staff of all state-supported institutions. While the majority of systems are supported by both teachers and public, two states and about seven local communities operate straight pension systems. In two states and thirteen local communities the teachers are the principal contributors to the retirement funds. The minimum age at which a teacher may be granted an allowance is most commonly set at 60, for the state systems at least, while the aggregate service most commonly required is 30 years. In nine state-wide systems retirement is made compulsory at 70. Flat benefits are paid in the case of 31 state and local systems; in some of the more elaborate plans, the teachers' deposits are used to purchase an annuity, and the state's or city's payments provide a proportionate

[1] Paper prepared for conference on "Old Age in America," ninety-third annual meeting of the American Statistical Association, Tuesday, December 29, 1931, Washington, D. C.

[2] National Education Association, Committee on Retirement Allowances. *Report.* Washington, D. C.: the Association. July, 1932. In preparation.

pension for current and prior service. Control of these systems is generally in the hands of a specially-created retirement board.[1]

2. *Supplementary measures.*—In addition to retirement and pension systems, a number of supplementary measures have been tried. Relief funds available for members of 88 state and local teachers' organizations contribute in some cases to the needs of individual retired teachers. In a half dozen states, permanent homes for aged teachers have either been established or been under consideration.[2]

B. Adequacy of Existing Provisions for Aged Teachers.

The adequacy of existing provisions for aged teachers will be discussed from the standpoint of: First, the size and salary of the teaching personnel. Second, the savings and supplementary income reported by aged teachers. Third, the needs of the teaching group. And fourth, the financial or other forms of assistance available to retired teachers.

1. *Number and salaries of present teachers.*—Statistics of state school systems for 1927-28 report the total number of teachers, supervisors and principals in public elementary and secondary schools to be 854,230.[1] The average salary of teachers, including supervisors and principals, was $1,364 in 1928.[2] This was about 70 per cent of the estimated average income of gainfully-occupied persons.[3]

2. *Savings and supplementary income of teachers.*—Although few data are available on the savings and supplementary income of teachers, a study of 509 retired Pennsylvania school employees showed that retired employees, at least, have very little income outside their retirement allowances.[4] The median annual income from personal savings reported by 433 employees was $103. Only 29 out of 410 employees indicated an annual income from inheritance of more than $300.

3. *Minimum living requirements of teachers.*—Up to this time, budget studies for public school teachers have been confined to expenses of active teachers, with particular reference to development of adequate salary schedules. Minimum salary levels suggested for active

1 For details of state teacher retirement plans, see National Education Association, Research Division. "Current Issues in Teacher Retirement." *Research Bulletin* 8:221-88; November, 1930. Washington, D. C.: the Association, "Teacher Retirement Issues in Theory and Practice," p. 235-70. For data on local plans see National Education Association, Department of Classroom Teachers. *The Economic Welfare of Teachers.* Sixth Yearbook. Washington, D. C.: the Department. June, 1931, p. 121-23.

2 National Education Association, Department of Classroom Teachers. *Op. cit.* p. 142-66.

1 Phillips, Frank M. *Statistics of State School Systems, 1927-28.* U. S. Dept. of the Interior, Office of Education. Bulletin, 1930, No. 5. Washington, D. C.: Government Printing Office, 1930. Table 18, p. 34.

2 *Ibid.* p. 3.

3 For estimates on the average income of gainfully-occupied persons, see King, Willford I. *The National Income and Its Purchasing Power.* New York: National Bureau of Economic Research, Inc., 1930. p. 87.

4 Shaw, Reuben T. *A Study of the Adequacy and Effectiveness of the Pennsylvania School Employes' Retirement System.* Philadelphia: Pennsylvania State Education Association, 1926. p. 96, 99, 106.

teachers on the basis of one such study were $1,380 for elementary teachers, and $1,860 for high school teachers.[1]

The needs of the superannuated teacher have been more or less a matter of conjecture. The study of Pennsylvania retired school employees cited previously showed a large number of the employees to be more or less dependent on relatives or friends for support.[2] Of 79 who had taken a position since retirement, 40 were receiving less than $300 per annum from this position. The opinions of 367 retired employees were secured concerning the annual amount they considered necessary to meet minimum needs. Amounts suggested ranged from $100 to $2,700 per year. The median estimate of the entire group was $632.

4. *Financial and other assistance available to retired teachers.*—In 1927 secretaries of state-wide retirement systems reported average retirement allowances ranging from $212 to $904; city retirement systems were paying average allowances of from $360 to $1,200.[3] A preliminary analysis has recently been made of the 2,950 retired members of the Pennsylvania School Employes' Retirement System.[4] This analysis, to be duplicated for additional systems, was undertaken by the Research Division of the National Education Association, with the cooperation of the National Council of Teachers' Retirement Systems. The Research Division was assisted in the analysis for this state by Mr. H. H. Baish, Secretary of the Pennsylvania School Employes' Retirement Board.

The analysis covered all employees, living or dead, who had been retired since the establishment of the teacher retirement system in July, 1919 to May, 1930. Of the 2,950 retired members, 1,849 or 63 per cent were certificated employees retired for superannuation; 33 per cent of the 1,849 were men, 67 per cent women.

Among certificated retirants, the ages at retirement for superannuation ranged from 62 to 88. The average age at retirement was 67 for both men and women. The average age would have been somewhat lower if members who were over 70 when the retirement system was established had been excluded from the calculations.

Men retired for superannuation were granted allowances ranging from less than $100 to more than $3,000. The allowances of women retired for superannuation ranged from less than $100 to about $2,700. The average retirement allowance granted to certificated superannuation retirants was $623 for men and $687 for women. For all certifi-

[1] Hart, F. W. and Peterson, L. H. *Teachers' Salaries in San Francisco.* San Francisco: San Francisco Teachers Consolidated Salary Study Committee, 1929. p. 100, 104.

[2] Shaw, Reuben T. *Op. cit.* p. 99-100, 104, 107.

[3] National Council of Teachers' Retirement Systems. *Proceedings.* Dallas, Texas. February 23-24, 1927. p. 18-19.

[4] National Education Association. Committee on Retirement Allowances. *Op. cit.* In preparation.

cated superannuation retirants together, the average retirement allowance was $666 or 51 per cent of the average final active salary of $1,302. The general trend of allowances was upward as the total number of years of service credit increased. The average allowance increased steadily as the final salary increased, ranging from $157 in the salary group below $400 to $2,860 in the salary group of $5,000 and over.

In this state, as well as in several others, local teachers' associations make funds available to retired teachers who are in need. Donations have been made to such teachers from the Chester Teachers' Association Relief Fund and the Louise H. Haeseler Memorial Fund of the Philadelphia Teachers' Association. The income of the Temporary Aid Fund of the Pittsburgh Teachers' Association is used to aid retired teachers who are not eligible to benefits under any retirement plan. The Lloyd Mifflin Memorial Home at Columbia, Pennsylvania and the Hannah Martin Home at Wilkinsburg, Pennsylvania will in the future accommodate a number of aged teachers.[1]

C. Need for Additional Data.

To secure an adequate picture of the status of the retired teacher, data must be available for teachers in other states and systems. Data are gradually being assembled on the needs of active teachers. Although information is now being collected concerning retired members of present teacher retirement systems, the significant facts are not yet available. In addition, a longer period will be required to test the results of present retirement systems and the various supplementary measures that have been organized. Only continued experiment and research will make clear the needs and problems of the retired teacher.

1 National Education Association, Department of Classroom Teachers. *Op. cit.* p. 158-59, 163-64.

FIRST ELEVEN MONTHS OF OLD AGE RELIEF OPERATIONS IN NEW YORK STATE

By DAVID M. SCHNEIDER

The Old Age Relief Law, recorded on the statute books as the Security Against Old Age Want, took effect on May 1, 1930. However, no applications for relief were received prior to September 1, 1930, and no allowances were paid before January 1, 1931. The law provides that Old Age Relief is to be granted to any person who

1. Has attained the age of seventy years;
2. Is unable to support himself, either in whole or in part; and has no children or other person able to support him and responsible for his support and financially able to do so;
3. Is a citizen of the United States;
4. Has been a resident of the State of New York for at least ten years immediately preceding his application for Old Age Relief;
5. Has been a resident and an inhabitant of the public welfare district in which the application is made for at least one year immediately preceding the date of application;
6. Has not made a voluntary assignment or transfer of property for the purpose of qualifying for Old Age Relief; and
7. Is not in need of continued institutional care because of his physical or mental condition.

Inmates of institutions, who did not require continued institutional care, were allowed to file their applications for Old Age Relief with the understanding that they were to leave the institution as soon as their application for relief was approved.

The State of New York is divided into seventy-nine public welfare districts for the purpose of administering the Old Age Relief Law. These public welfare districts are being reimbursed one-half of the cost of Old Age Relief and administration. Supervision of the administration of the law is placed with the State Department of Social Welfare through its Division of Old Age Security.

During the first eleven months in 1931, more than 82,000 applications for Old Age Relief were filed with the public welfare districts; 49.3% of applicants were men and 50.7% were women. Slightly over 45% of applications came from New York City. Up to December 1, 1931, public welfare districts have made decisions on 71,767 applications. The per cent of grants in New York City was 67.6 as compared with 70.0% for the rest of the State and 68.6% for the entire State. It is interesting to note in this connection that in January, 1931, the per cent of approvals was greater, 79.1% for New York City and

78.2% for the entire State. The increase in proportion of denials may be explained by the fact that the public welfare commissioners, because of greater familiarity with the Old Age Security Law, have become more exact in administering it.

During November, 1931, 46,164 aged persons were recipients of Old Age Relief. They were divided almost equally between New York City and the rest of the State; 48.2% received allowances in New York City, while 51.8% benefited in the rest of the State. The total amount of relief expended during November, 1931, was $1,215,289. Of this amount, New York City spent $714,130 or 58.8%, while the rest of the State disbursed $501,159 or 41.2%. The average monthly grant for the entire State, based on the November, 1931 returns, was $26.33, the New York City figure being considerably higher, namely, $32.07 as compared with the average grant for the rest of the State of $20.97. Here again, it is worth while to mention that the average monthly grant has been decreased, as compared with January, 1931, when the average monthly grant for the entire State was $28.69 and for New York City $34.43. The actual amounts for Old Age Relief disbursed during December, 1931, are not as yet available. However, it is our estimate that the relief allowances for the calendar year 1931 will amount to a little over $12,000,000. This estimate is based on the actual returns for the first eleven months plus the estimated amount for December, 1931. The cost of administration of Old Age Relief by the State and by the public welfare districts for 1931 will amount to approximately $1,000,000, making a total of $13,000,000 (including allowances) for the first year. The Division of Old Age Security of our Department, in cooperation with the Research Bureau, estimates that it will cost $16,500,000 to administer Old Age Relief in New York State for the calendar year 1932, of which slightly over $15,000,000 will be spent for actual relief allowances. We estimate that the peak will be reached sometime in 1932, when 50,000 aged persons will receive allowances under the Old Age Relief Law. This number is considerably higher than the estimate by the New York Commission on Old Age Security, which estimated that by 1934 there will be about 51,000 recipients of Old Age Relief. They estimated that during the fiscal year ending June 30, 1932, $6,500,000 would be paid to approximately 27,000 persons.

There were expectations on the part of certain interested groups that a relatively large number of persons would leave the public homes (the former almshouses) and the private homes for the aged on account of being granted Old Age Relief allowances. This Department receives monthly reports of admission and discharge from the existing sixty-two county, city and town homes. Although in a number of instances the public welfare officials were not specific as to the exact reason for discharge, it is our belief that the number of persons over

seventy leaving the almshouses on account of the Old Age Relief Law during 1931 did not exceed 250. The majority of the private homes for the aged were not required until now to report to the State Department of Social Welfare and hence no figures are available as to the number of inmates leaving private homes for the aged after Old Age Relief allowances were granted to them. Still, from personal contact with the different agencies and institutions, we have much reason to suspect that the number of discharges from private homes for the aged, due to the operation of the Old Age Relief Law, is very small.

The Department has analyzed the approved applications for Old Age Relief which were received by the State prior to May 1, 1931. Very interesting sociological data are disclosed by this analysis. The majority of the applicants are widowed (54.3%). The next largest group are the married applicants (30.2%). The per cent of single applicants was 13.3. About 95% of recipients of Old Age Relief were white. The religion of the applicants was tabulated as follows: 61.4% Protestant, 31.7% Catholic, and 6.3% Jewish. This picture changes to a considerable extent if we take separately New York City, and compare it with the rest of the State. In New York City, there were 43.5% Protestants as compared with 79.3% for the rest of the State. The Catholic group in the Metropolitan area was 44.1%, while in the rest of the State there were only 19.2% belonging to this faith. Insofar as the Jewish applicants are concerned, most of them live in New York City. They constituted 12.1% of the entire New York City group and only 0.4% for the rest of the State. More than half of the applicants were of the age group 70-74 (52.3%) and almost one-third belonged to the age group 75—79 (30.4%). A much younger group applied from New York City than from the rest of the State. In New York City, 58.1% of applicants were of the age group 70-74, while in the rest of the State only 46.7% belonged to the same age group. Insofar as the nativity of the applicants is concerned, we find that more than two-thirds of them (69.7%) were native born, and that 55.7% of them were born in New York State. The majority of foreign born (7.3%) came from Germany, 7.1% from Ireland, and 3.1% from Great Britain. We find again that for New York City the proportion of native born was considerably smaller than for the rest of the State, percentages being 53.8% for New York City and 85.4% for the rest of the State. In our analysis we find that 55.8% of the native born group were also of native parentage. We were trying to ascertain how many of the successful applicants had legally responsible relatives. We found that approximately one-third of them had no legally responsible relatives at all, 5.2% of them a spouse only, 15.5% a spouse and children, and 45.6% children. The condition of health of the applicants at the time the application was filed was disclosed as follows: Almost 30% were recorded as healthy, approximately 60%

as frail, and 10.5% as ill. The former occupations of applicants were analyzed separately for the male and female groups. We find for New York City almost half of the male applicants (47.4%) belonged to the manufacturing and mechanical industries. The male persons engaged in trade and in domestic and personal service were almost evenly divided (11.5% and 11.7% respectively). The tabulation for the female group in New York City discloses that more than three-fourths of the entire group (76.5%) were engaged in the domestic and personal service groups. This figure ought to be discounted to a very large degree because many housewives were recorded under this group. One-eighth of the female applicants in New York City were engaged in the manufacturing and mechanical industries. For the rest of the State, more than one-half of the male applicants (53.2%) were engaged in the manufacturing and mechanical industries. The next largest group was the agriculture and forestry, where 27.2% of the applicants were engaged; 11.7% of the female group in the rest of the State were also working in the manufacturing and mechanical industries.

The analysis of the reasons for denial show that the greatest number of cases was denied because the applicants possessed a sufficient amount of real or personal property (25.8%); almost 14% of the cases were denied because responsible relatives could support the applicants. In approximately 11% of the cases of applicants whose applications were denied, the applicant was not 70 years of age and in 8.5% the applicant was not a citizen.

Largely due to the fact that the reimbursement on the part of the State to the public welfare districts was conditioned upon the meeting of the requirements set by the State Department of Social Welfare, we were able to secure one hundred per cent prompt statistical reports. It is believed that the requirements to obtain reimbursement from the State for Old Age allowances and administrative expense are such (exclusive of the factor of self-interest) as to redound to improving all of the data furnished to this Department by the public welfare officials. These officials in the main are also responsible for other phases of public welfare relief. The requirements of this Department relate not only to financial accuracy in the claims submitted to the State but also to a reasonably thorough piece of work in record keeping and investigation of each application before decision is made. We feel that the training being received in this connection will be reflected in other phases of relief activities in each district.

SOME SOCIAL AND ECONOMIC ANTECEDENTS OF BANKRUPTCY

By JOHN H. COVER

The survey of business readjustment, of which this summary is a report of progress, includes two phases: (1) insolvency, and (2) rehabilitation. It is hoped by the analysis of this problem that certain danger signals and guideposts may be indicated for the going concern.[1]

Methods used include the following: 1) an interview with each bankrupt at the bankruptcy court; 2) letters to a minimum of three creditors; 3) in some instances, reference to books[2] of the concern; 4) field survey of the neighborhood of the bankrupt; 5) a study of related data; and 6) case and statistical analysis.

The neighborhood survey includes interviews with competitors of the failed business man; surveys of the location of the store, of the residence district, a general picture of the physical and social characteristics of the neighborhood in which the debtor conducted his business or carried on his work or in which he lived. Related data include neighborhood barometers such as rentals, factory shutdowns, population and other factors; business standards as practiced by going concerns in that particular district, as well as the success of other forms of operation such as creditor counseling and management. From the employee point of view, consumer financing is a significant point.

Included in this report are 86 per cent of the cases appearing before the bankruptcy courts in the period January 7—June 14. This section of the federal court has jurisdiction over Cook and Lake counties in Illinois, the former including the city of Chicago. In order that some of the problems of seasonal significance may be estimated and samples of groups enlarged, cases are still being collected. There are certain dependent factors which may be difficult to separate, such as the relationship between the failure of a retailer and the insolvency of the wholesale concern with which it dealt, or the respective responsibility of partners in failure. Case study and multiple correlations may aid in the weighing of many of these factors.

Two distinct types of data are collected, differing in emphasis upon business and consumer problems. The enterpriser has both his business and consumer problems; in addition, a large group of employee bankrupts is almost exclusively consumer in interest.[3]

[1] The United States Department of Commerce and the referees in bankruptcy have cooperated in the collection of data.

[2] Of the business cases studied, 31 per cent kept no books and only 35 per cent had what might be considered an adequate system of books.

[3] Only eight per cent of the business group and ten per cent of the employees were female.

The modal age group for all bankrupts was 36 to 40 years, represented by 20 per cent of the total number. However, the preceding and succeeding age classes each represented 19 per cent of all persons so that 58 per cent were 31 to 45 years of age. The age of consumers, most frequently represented, was 31 to 35, accounting for 22 per cent of the cases; 60 per cent occurred within the range of 31 and 45 years. The largest group for all retailers was 36 to 40 years, and for individual proprietors 41 to 45 years. The 1930 census of population for Chicago gives 35 to 40 years as modal representing 17 per cent of all ages. From an age point of view, the bankrupts are not greatly divergent from total population.

The range of income during the twelve months preceding bankruptcy for 297 cases of employees for whom data were available was from absolute dependency to $20,000. The modal group was $1,500 to $1,999, with 70 per cent of the cases occurring within the range $500 to $2,499.[4]

Residence rentals as well as total income were available for 293 of the employee group. The range of rents was from no rental to $380 per month, with the modal group from $41 to $60.99, representing 31 per cent of the cases. In addition, 29 per cent of the cases occurred within the range $21 to $40.99. Sixty-eight per cent of the cases paid $60 or less per month. Three per cent of the group paid rentals in excess of income. The group with from 30 per cent to 35 per cent of total income expended for rent was largest and represented 18 per cent of the total number of cases. Forty-seven per cent of the bankrupts paid less than 30 per cent of their total income as rent. This proportion of income expended for rent appears to be higher than other groups for which data are available.[5]

When ratios of rent to income for incomes from $600 to $3,200 is studied, it is found that a semi-logarithmic regression line gives a good fit. This law would indicate that 10 per cent additional income represents 2 per cent less of the income spent for rent; a 25 per cent additional income represents a reduction of 4.8 per cent in the income spent for rent; while 100 per cent greater income corresponds to a 15 per cent reduction in the proportion of income spent for rent.[6]

Of 300 cases for which these data were available, 28 per cent

[4] The midpoint, $1,750, of the modal group may be compared with the estimates of King in 1927 covering the United States, in which case the average wage was placed at $1,205, salary at $2,084, and average mercantile salary at $1,844. The United States Bureau of Labor Statistics found the average income for its federal employees in Chicago to be $2,745. The International Labor Office estimate for a Detroit employee in 1929 was $1,720.

[5] In a 1924 study of wage earners in Chicago, Miss Houghtelling, "Income and Standard of Living of Unskilled Laborers in Chicago," found the general average of 15 per cent of the total income paid as rent. A University of Pittsburgh study of salary earners in downtown Pittsburgh in 1930 found about 20 per cent to be the average.

[6] $y_c = 196.063 - 50.106 \log. x$; origin, $1,900; y unit one per cent; x unit income in dollars; S. E. 3.31%; S. D., 10.34%; r, .947.

recorded no expenditures for medical and dental attention. However, 24 per cent of the total number of cases having medical and dental expenses spent more than 20 per cent of the total income for this item. Less than 5 per cent was spent by more than one-half of the families.

About 16 per cent of the employee group received contributions from relatives or friends, the proportions of contributions to total income being widely scattered.

Total family expenditures and total income were available for 300 of the employee group. Of the modal income class, $1,500 to $1,999, 55 per cent spent the total income, with no savings, while 37 per cent spent in excess of the total income. In addition, liabilities incurred which the debtor is attempting to avoid through bankruptcy, are credit obligations.

For the income range, $600 to $3,200, the general tendency indicated an expenditure less by 3.8 per cent accompanying an income greater by 10 per cent; an expenditure 16.4 per cent less with an income 50 per cent more and an expenditure 28 per cent less accompanying a 100 per cent larger income.[7]

More than eight per cent of the employee group scheduled no assets; 43 per cent had assets approximating 2.5 per cent of the scheduled liabilities. Only slightly more than 4 per cent of the cases scheduled assets in excess of 50 per cent of liabilities. Realized assets, upon sale of scheduled assets, will be greatly shrunken in value, due to the practice of scheduling cost valuations and to the decrease of the price level.

Business Concerns

Data on the life-span of business concerns were available for 709 units. Fifty-five per cent of all firms had been in existence less than 5 years at the time of petition for bankruptcy. The five-year span was the length of life for 64 per cent of the partnerships, 49 per cent of the corporations, and 55 per cent of the individual proprietors. Similarly, the five-year period was the limit of existence for 67 per cent of the retail-food group, 51 per cent of the retail-clothing concerns, 75 per cent of the grocers, 64 per cent of the ladies' ready-to-wear firms, and 41 per cent of the men's furnishings stores.

Assuming the middle of 1922 as a good time from a cyclical point of view in which to enter business, and taking the middle of 1930 as the earliest date at which the group studied resorted to bankruptcy, we have a period of 8 years. Seventy-three per cent of all failed firms had been in business less than eight and 69 per cent less than seven years. The following percentage of the cases in retail trade

[7] $y_c = 418.689 - 92.9196 \log. x$, origin, $1,900; y unit one per cent; x unit income in dollars; S. E., 8.05%; S. D., 19.81%; r, .914.

failed prior to their eighth year; retail food 78 per cent, retail clothing 66 per cent, retail grocers 86 per cent, ladies' ready-to-wear 73 per cent, men's furnishings 50 per cent. Of the 709 firms represented in this group, 22 per cent had weathered the 1921 depression.

The extent to which expensive business accommodations were obtained in expectation of income is indicated by the large number of instances in which rent exceeded 100% of the total net sales. The maximum percentage was 360, represented by an individual proprietor in the retail field. Of 563 business cases for which data were available, 26 had no rent; there were 382 retail cases, 7 of which paid no rent, and 396 individual proprietors, 24 of whom paid no rent. The class of greatest frequency for all business concerns was from 5% to 9.9% of the total net sales recorded for 20.8% of the cases; the modal class of percentage of net sales expended for rent for the retail group was from 10% to 14.9%, representing 27% of the cases. In all instances, however, the classes adjacent to the modal groups had high frequency.

The expectation of earnings is apparent in the ratios of withdrawals to net sales. The greatest proportion was 900%. Only 3% of 530 cases for which data were available made no withdrawal. The modal class with 17% of the total frequencies was from 5% to 9.9%, but the high frequency of other classes limits the significance of the mode; for instance, the number of cases in the next higher class approximates 15% of the total and the 20%—24.9% class, 11%. Similarly for the retail group, the class centering at 7.5% had 17% of the frequencies, and the class with the midpoint 12.5% had 15%. In a large proportion of cases the concern could not withstand the support of its enterpriser.

Payrolls aggregated as high as 971% of the total net sales. Of 490 cases for which data were available 23% had no payroll, which was the case for 26% of 334 retail cases. The modal class for all business and for retail was from 5% to 9.9%, recorded for 12% of all cases and 16% for retail cases.

Fifty-five per cent of all business cases and 61% of all retail cases, the former 530 and the latter 366 in number, had no credit sales. Seventy-eight per cent of all cases had 70% or more of their sales in cash. Of those having credit sales 49% lost less than 5% of the total sales, and in the retail field 52% lost less than 5% of the sales. Twenty per cent of all cases with credit sales lost 50% or more of their credit sales and 42% lost 20% or more of their credit sales.

Sixty-eight per cent of the entire business group had assets approximating 2.5% of their net sales, while the retail group recorded 59% of their cases with assets of 2.5% of the sales.

Four and one-half per cent of all business concerns had no assets. Five per cent of the retail group and 2% of the manufacturing group

scheduled no assets. Assets aggregated less than 50% of scheduled liabilities for 67.5% of all cases for the total business group, 69% of all retail cases, and 52.9% of all manufacturing cases. The proportion of assets to liabilities was less than 10% for 28.7% of all business cases, 29.9% of all retail cases, and 8.8% of all manufacturing cases.

The business cases may be extra-marginal for the particular time period, or permanently; they are not necessarily uneconomic, though many are total wastes. It is not so easy to dispose of the employee, for he and his family still require subsistence. In both groups there are many extraneous, environmental elements affecting solvency. A preliminary summary of factors leading to failure and the per cent of cases affected follow. These estimates include the opinion of the bankrupt, a review of the case by the interviewer and test references to creditor opinion; they do not, however, represent final conclusions based upon case and neighborhood analysis.

REASONS FOR FAILURE—BUSINESS CASES

CAUSES	FIRST CAUSE *Per cent of Total Cases Affected by Each Factor*	SECOND CAUSE *Per Cent of Total Cases Affected by Each Factor*
Too many goods sold on open credit ...	5.4	1.8
Insufficient capital	6.1	6.8
Too large rent: Business	4.6	6.3
Competition	9.2	11.3
Lack of Business Experience	11.5	5.9
Real Estate Slump	4.8	3.2
Business Depression*	20.9	24.8

*This term is too inclusive and too available as an alibi; the depression is probably merely the occasion of failure.

REASONS FOR FAILURE—EMPLOYEES

CAUSES	FIRST CAUSE *Per cent of Total Cases Affected by Each Factor*	SECOND CAUSE *Per Cent of Total Cases Affected by Each Factor*
Real Estate Slump	5.0	5.9
Signing Notes	3.8	2.9
Business Depression	4.7	8.5
Real Estate Speculation	7.6	5.9
Illness	6.5	5.0
Medical Expenses	6.5	9.1
Cost of Support of Family	2.9	8.2
Family Difficulties	2.6	3.8
Part Time Employment	11.7	5.3
Unemployment	5.6	4.4
Too many goods purchased on installment plan	2.1	4.7
Decrease in Income	5.6	7.6

COMPOSITE REASONS[8]

CAUSES	BUSINESS	EMPLOYEE
Inefficient Management	34.8%	*
Extraneous Conditions	45.2	14.8
Speculation	3.8	13.9
Family Conditions	4.5	55.6
Miscellaneous	11.7	15.7
	100.0	100.0

*It is difficult to measure the effectiveness of control of family affairs. Therefore, this item has been omitted from the preliminary estimate.

8 Management includes excess credit sales, inadequate credit investigation, too rapid expansion, exorbitant rent, poor location, inadequate accounts, lack of experience, inattention to business, overstocking of merchandise; environment includes competition, changes in neighborhood characteristics, insolvency of customers, business depression, etc.; Family Conditions include illness, unemployment, installment purchases, family disagreements, etc.

SUMMARY OF PAPERS PRESENTED AT THE JOINT LUNCHEON ON SOCIAL SCIENCE ABSTRACTS

By F. STUART CHAPIN

Professor Richard Thurnwald of the University of Berlin, as guest speaker at the luncheon, opened the discussion of the subject SOCIAL SCIENCE ABSTRACTS *as a Means of International Intercourse in the Social Sciences.* He spoke very briefly on the advantages of this service and expressed the difficulty and importance of gaining an objective and impartial view on social situations. He presented three points responsible for increasing the difficulty at the present time; the national interdependence of the European-American civilization; the need of social adaptation to the swiftly increasing accomplishments of modern, technical and scientific inventions; and the clash of cultures since the World War, entailing the subsumption of the whole world into the social and political process of humanity. He stated that the task of SOCIAL SCIENCE ABSTRACTS is to strive for a broader and more comprehensive view upon the affairs of man.

Professor L. L. Bernard of Washington University stated in his discussion of the subject that in spite of the large sums in the aggregate spent in this country by our libraries in subscriptions to foreign periodicals, the larger portion of these journals are very difficult of access to the researcher, even when he can avoid the usual restrictions upon lending. In summarizing Professor Bernard outlined the two major purposes of SOCIAL SCIENCE ABSTRACTS as one, the collection of an international bibliography of important current literature, and second, the provision of abstracts of the chief content of the more important current literature from all parts of the world.

Professor Amry Vandenbosh of the University of Kentucky continued the discussion by stressing the value of SOCIAL SCIENCE ABSTRACTS as an important international means of communication under existing conditions, when information must be gathered from the ends of the earth and from the borderlines of the sciences. He stated that SOCIAL SCIENCE ABSTRACTS is especially of value to those who have to work with the limited library facilities of our smaller educational institutions. He cited his own case at the University of Kentucky as fairly representative of the medium-sized state university. He found there that of the 811 periodicals available in the library, only 25 fell in the field of social science, even under a liberal construction of the term. SOCIAL SCIENCE ABSTRACTS examines 4,500. In working in the field of colonial policy and administration, and in particular on the Dutch East Indies, Professor Vandenbosh finds that SOCIAL

SCIENCE ABSTRACTS is practically the only means he has of keeping up with the literature in that field.

Dr. F. Stuart Chapin, of the University of Minnesota, and editor-in-chief of SOCIAL SCIENCE ABSTRACTS spoke on importance of the selective principle in providing a systematic monthly follow-up of the best thought on problems of economic, political and social relations expressed in all languages, thus discarding the trivial, irrelevant and inaccurate, and concentrating on the selecting of new and important contributions. In reviewing the huge organization of scholars participating in this enterprise he stated that fifteen hundred collaborators select from 4,000 serials in 35 languages only the best that is written, estimating that 95 per cent of the contents of the serials examined unimportant, thus having accessible and in English the best 5 per cent of thought, or some 19,853 important articles abstracted in 1931. He stressed the utility of a wide-flung international organization for the systematic selection of important material, in that the great bulk of the best material is derived from a long list of miscellaneous journals from which an occasional article is taken. The number of abstracts from this source is surprisingly large because of the great many fugitive periodicals.

Dr. Chapin showed the inadequacy of library facilities by a check on 950 periodicals cited in the May and June numbers of 1930; taking only the 225 largest libraries of the country, it was found that only 76 per cent of these periodicals were available in fewer than 46 libraries, 52 per cent were available in fewer than 21 libraries, 33 per cent in fewer than 11. The obverse of this fact, he stated, is that SOCIAL SCIENCE ABSTRACTS makes the summary of the best in all these periodicals accessible.

Dr. Laverne Burchfield of the staff of SOCIAL SCIENCE ABSTRACTS, in her address at the joint luncheon, reviewed the periodical coverage situation, and also stressed the selective principle as summarized by Dr. Chapin. She stated that the process of selectivity is in a constant state of evolution, that is, the discarding of journals which, after months of watching, are safely dropped from the list, watching for new journals as they appear, following up leads on established journals, and in this way adding at least forty new journals to the list each month. She stressed the difficulty and complexity of periodical coverage, due to the limitation of library facilities for many abstractors, stating that the ideal method would, of course, be to receive all periodicals to be covered in the central office.

Dr. Burchfield briefly reviewed the intricate process of putting out an issue of the ABSTRACTS; covering library accessions, clearing titles on the central periodical file to avoid duplications, assigning titles and journals, following up assignments, checking back numbers to assure complete coverage of journals, editing abstracts to fit into space limita-

tions, presenting the most significant points, classifying, cross-referencing, attaching slips for the monthly and annual subject indexes, each editor cross-reading copy for one field in addition to his own, assembling and numbering copy, sending it off to the printer, and finally reading two page proofs. In conclusion she urged that the ABSTRACTS be made available in main and departmental libraries, because of their value as a research tool, as a guide to the reader, who must know what he can most profitably read, and as a resume for the busy scholar who wishes to have, in brief form, a survey of thought and development outside of his own field.

BUILDING PERMITS AS A BASIS FOR ANALYZING BUILDING ACTIVITY

By JOHN H. COVER

Permits are an adaptation to measuring building activity; their original purpose was the protection of community development. Their significance as barometers depends not alone upon a differentiation between types of building and between numbers of permits and permit values, but, in addition, upon the power and efficiency of local permit officers and the corrective adjustment in the process of analysis.

In some instances one permit will suffice for a total piece of construction, whereas in others separate permits are obtained for each unit of a building. The latter is particularly true when contracts are awarded directly rather than upon a sub-contract basis. Consequently, one permit may represent a valuation of $50 or of $5,000,000. For the year 1929, the total Denver building permit values were $16,633,600, an increase of 4.2 per cent over 1928. However, the valuation for the municipal building, $4,250,000, constituted 25.6 per cent of the year's total; were this item eliminated, there would be shown a decline of 22.4 per cent from the year 1928.[1]

It is difficult to define a building unit; even in a classification of residences there is no standardization in terms. There is no accepted relationship between construction and human habitation. Neither a house of three rooms nor an apartment house of 100 apartments is significant with reference to the number of people accommodated. And we have no unit such as is popular in certain portions of Europe, defining a room as that space large enough for an adult bed.

Certainly from the point of view of estimating available building space, vacancy surveys are essential. The current demand for smaller living units is widespread. There has been in certain communities a noticeable migration to buildings constructed some years ago, with the abandonment of newer buildings leasing on high rent levels. Some of this change has been associated with doubling up. Despite this tendency, some communities have registered new apartment house construction approximating three and one-half times as many building units for 1931 as for the previous year.

Frequently considerable variation occurs between actual and estimated cost, particularly when costs as estimated are to be related to published market prices, issues of mortgage bonds, taxation, or other factors. In one instance a permit was issued at an estimated valuation of $14,000,000. The contractors reported to the newspapers a

1 University of Denver Business Review, Vol. VI, No. 1, January, 1930.

valuation of $12,000,000. The actual construction cost, $10,000,000, is the result of lower prices reached since permitting. Where valuation is translated into permit fees and retranslation into valuation must be made for purposes of analysis, such values can only be approximated.

In some instances building permit fees are not based upon the estimated valuation but upon cubical content and the quantity of certain materials used. As an instance, one large city requires that structures up to 100,000 cubic feet must pay 30 cents a cubic foot and in excess of 100,000 cubic feet, 60 cents. Additional fees are charged for elevators, etc., and 5 cents per thousand bricks, 8 cents per hundred cubic feet of concrete, and 15 cents per hundred yards of plastering. These fees are intended to cover the cost of inspection by the local department of buildings as necessary to the protection of public interest as governed by the building code. In some communities the building department carefully checks the estimates of cost submitted and there are records of many instances in which the cost estimate has been increased. Similarly there are instances in which, through the careful checking of the progress of construction, correction of values have been made.

An important shortcoming of the value series is, of course, the necessity of deflation, or correction for changes in construction costs. Could we find an adequate index number representing cost of construction, the use of permit values would be more significant.

It is, of course, extremely difficult to weight properly the various elements of cost entering into a modern complex structure, despite the claim for an index of a particular company that "cost of labor took into account labor efficiency." While cost of material and of labor are included in most indexes, other items such as cost of credit are usually overlooked. Particularly in times of depression, material dealers sell at prices below list and labor is employed, not alone below published union rates but with assurance of greater efficiency, as well. Over a period of time the inter-relation of the composite series upon which price index numbers are based may alter the responsiveness of the index to changing conditions. Similarly, an index of cost of construction may fall or rise while a given permit valuation based upon cost per cubic foot for material and labor may show little change.

With an index number of cost and construction completed, we still have the problem of the application of such index numbers to the values of construction for purposes of deflation. This requires certain mathematical assumptions which are not necessarily satisfactory.

Regional and local differences vary greatly, and it is the responsibility of the persons making use of the material to investigate carefully the soundness of local practice.

A significant contrast is that between urban and rural areas. In many agricultural regions, farm buildings do not require building permits, and cities and towns vary considerably as to the ordinance requirements. In some communities, sheds, garages, additions to houses, etc., are not required by ordinance to have permits, while in others expenditures of $50 or more require such permits. Similarly, while in some cities construction of industrial and utility structures outside the city are recorded, in others, no building beyond the city limits is noted.

In some communities fire or police officials are entrusted with the responsibility of registering permits when not otherwise employed. In many instances, efficiency is a matter of conscience. Checking records of a large city for a period of six months, it was found that two officials had widely varying estimates for twenty-one of the fifty large projects recorded.

Use of materials differs widely as between regions; for instance, in Philadelphia, according to the 1920 census, wood approximated one-half per cent of the total of material used, whereas in Los Angeles it aggregated 62 per cent of the total of materials.

Appreciation and depreciation in property values differ widely in communities. There is a wide difference in the life span expected in different communities which to a degree governs the type of constructions erected.

Frequently, long gaps in time occur between the issuance of permits and the undertaking of actual construction. In such instances, a permit to occupy, such as is frequently granted in Europe, might be of some significance. Similarly, projects are frequently abandoned after the issuance of permits. This factor might be corrected by requiring at the time of issuance of the permit a bond for completion of construction which could be confiscated if the construction were abandoned. A record of bonded contracts signed and of abandoned construction would assist in the correction of records. This is not a radical proposal, since many communities already require a wreckage bond to protect their citizens from danger in the razing of property.

As an example of a completion record, a check was made in December, 1931, of building permitted in Chicago in the period January through June, 1930. The tabulation follows.

	$100,000—499,000	$500,000 and over
Less than one-half completed	1	1
Never started	2	0
Finished in 91—180 days**	9	0
Finished in 181—270 days**	11	1
Finished in 271—360 days**	5	3
Finished in 361—450 days**	3	1
No final building report*	10	3
	41	9

*Previous reports indicated nearly completed.
**Daily reports were used. No project was completed within ninety days.

About 56 per cent of the Chicago residential construction for 1930 was for projects valued less than $100,000. Of those in excess of $100,000 valuation, 2.6 per cent were never started, final reports for 30 per cent had not been recorded, and 68 per cent had been completed by December, 1931.

In analyzing residential construction, it would be well to consider—separately and in addition to total numbers and values—the data for small structures under $30,000 (B. L. S. classes 1 and 2). This separation eliminates dwellings containing stores and the large projects which so overbalance aggregates; for these large projects increase irregularly the time lag and overemphasize the proportion of abandoned or partly finished construction.

Of 1930 permitted non-residential construction, 76.5 per cent were valued at $100,000 or more. Forty-five per cent of the projects for which records were available, were completed by December, 1931, and 29 per cent were close to completion. But small progress was reported for 24 per cent.

Permits are issued, of course, only for new construction and have no validity with reference to available supply or to changes in ownership. Permit records are not necessarily comparable with preliminary estimates of construction usually referred to as awards, since they are usually more complete and closer to the actual building activity. In the period 1920—1930, comparison of annual index numbers of permit values and of the valuations of awards for the seventh Federal Reserve District indicates that five of nine changes were in opposite directions. Other series that may well be used jointly with permit and permit values are real estate transfers and censuses of vacancies.

Where the issuance of a permit is predicated upon the existence of a contract at least for excavation, where there is a careful check of the contract valuation and of the actual ultimate cost together with correction of the estimated cost, permit series should be quite valuable.

Even with present faults, building permits and permit values remain the best available general indexes of building activity.[2]

[2] The author expresses his appreciation to Mr. Vincent Cohenour for participation in the collection and analysis of data upon which this discussion is based.

PROGRESS IN MAKING BUILDING OCCUPANCY SURVEYS

By JOHN R. RIGGLEMAN

The practical value of vacancy or occupancy statistics is now generally appreciated, since they are of great help to business men, home buyers, and others in their efforts to determine when there is an oversupply or when there is an undersupply of building space. Ten years ago very little information was available upon the occupancy or vacancy situation in buildings. During the last few years, vacancy surveys of one kind or another have been made in about 160 different cities. Many of them have been very limited in scope, but the development indicates a growing interest in such data.

The credit for making nearly all of the residential surveys that have been made belongs to the local real estate boards, although there are instances where such surveys have been made by educational institutions, police departments, post offices, private firms, and other organizations. Most surveys of office building vacancies have been made by the local office building owners' and managers' associations.

During the past year the Department of Commerce, through its Division of Building and Housing, has cooperated with the National Association of Real Estate Boards and other organizations in carrying on the work of developing and standardizing residential occupancy surveys. In this work the Department of Commerce work is keeping in close touch with the National Conference on Construction, whose statistics committee has a special subcommittee, which is giving much of its attention at present to the problem of making vacancy surveys. The aim of this work of developing and standardizing occupancy surveys is to assist in coordinating effort and in filling in any gaps, without duplicating the work that anyone is doing. To this end it is hoped that the following results may be achieved:

1. Greater cooperating of the agencies that can furnish assistance in making the surveys.
2. Standardization of the date of making the survey.
3. Standardization of the classifications by which the information is reported.
4. The furnishing of a set of suggested forms that can be used by local groups in making surveys.
5. The furnishing of a manual of instructions for making occupancy surveys.
6. The preparation of a national report at some central agency which is prepared to compile and publish such information.

To date the progress that has been made on the above listed items is as follows:

1. The Division of Building and Housing has established contacts with 160 organizations that have made vacancy surveys. The general feeling seems to be that the local survey should not be made by one organization, but should be made under the joint sponsorship of a group of organizations. The National Conference on Construction and the Department of Commerce are cooperating in the work of standardizing surveys and improving the methods of carrying on the work. A joint committee of interested associations is working with the Post Office Department on the question of post office assistance.
2. The Division of Building and Housing, through questionnaires, investigated the problem of standardizing the date of making the survey. While there were many variations in dates preferred, the strongest argument seemed to be advanced for making a fall survey, probably some time in November. It seems that surveys made at this time would be the most valuable considering all parties concerned. If they are made later than the end of the year, the information would not be available in time for use in making many of the financial arrangements that have to be made before spring construction begins.
3. The difficult problem of statndardizing the terms by which the different types of dwellings may be classified, has been investigated and studied through the use of questionnaires, and a suggested classification designed to cover most of the types, but allowing for additional classes for local use, is being prepared. This suggested classification is to be submitted for further suggestions to those who have already made vacancy surveys.
4. On the basis of information collected from many of those who have made vacancy surveys, and in cooperation with the National Association of Real Estate Boards, a suggested form for recording field information and a suggested table form to be used in compiling the data from the field cards, have been prepared and included in an occupancy survey manual.
5. A suggested manual of instructions for use in making occupancy surveys, has been prepared and has been submitted to a number of individuals and organizations for criticism.
6. A compilation of residential vacancy data from surveys made in 42 cities has been made. The interest in this report, as limited as it is, indicates the need for a national report based upon uniform methods of reporting occupancy data at a standardized date.

A joint committee on occupancy surveys, previously referred to, which is sponsored by the National Association of Real Estate Boards, and which is composed of members representing the National Association of Real Estate Boards, Mortgage Bankers Association of America, National Association of Building Owners and Managers, Associated General Contractors of America, and the American Statistical Association, is working with the Post Office Department in an effort to develop a feasible plan for securing Post Office cooperation in enumerating field data. As the instructions from the Postmaster General to the postmasters now stand, the post offices are authorized to gather information on vacancies only. The joint committee has worked out a simplified plan, whereby, it is hoped, the information on units occupied, vacant, and under construction in the principal types of buildings, and the number of extra families in residences, can be recorded on specially prepared cards, by small unit areas.

LIMITATIONS OF FINANCIAL STATISTICS RELATING TO BUILDING ACTIVITY

By W. C. CLARK

I interpret this title in the narrower sense; that is to say, to mean the limitations of the statistics relating to the financing of urban buildings rather than the limitations of all building statistics expressed in financial terms as distinct from physical quantities. My remarks will be of a very elementary nature; it is scarcely an exaggeration to say that we have no data sufficiently reliable or complete or available over a sufficient period to provide a time series which would justify the application of refined statistical technique.

The inadequacy and unreliability of the statistics in this field are justly matters of great regret. The market for building capital is a highly complicated and comparatively unorganized one—rather it is a congeries of different markets of highly varying degrees of organization. Yet, if a measure of control is to be effected over the construction industry in order to forestall the extremes of over-building with their calamitous consequences with which we are now all too familiar, such control must be largely exercised through this capital market—through the institutions which provide the funds upon which the industry depends. If such control is to be exercised, tools are necessary, and tools of a reasonable degree of precision. Specifically, we need first to know the total draft which the building industry is making upon the country's capital markets, the total amount of mortgage credit outstanding at any time and the total volume of such credit granted during each year. If comprehensive figures were available, we would probably be amazed at the magnitude of these totals, just as we would be amazed at correct figures for our aggregate annual construction activity, which our inadequate statistics have led us persistently to underestimate, in my opinion, by as much as several billion dollars. In the second place, we need to have these aggregate figures broken down into their constituent parts —that is, we need to classify mortgage loans by purpose of issue and by the class of structure which provides the mortgage security. Preferably, we should have this information on a monthly basis. Only thus can we recognize developing situations, trace unsound trends to their causes and arrange to apply appropriate controls. Finally, we ought to know the prices at which demand and supply in the various branches of the building capital market are being equated, changing trends in the nature and form of the capital instruments which are being employed, and all possible data in regard to foreclosures of properties, defaults on mortgages, failures of financing institutions and other financial involvements which indicate the development of unsound situations or

tendencies. Complete statistics on some of these matters may be too much to expect, but adequate samples, at least, are essential, if we are to have the basis of intelligent and effective control.

For the Building and Loan Associations, which now occupy the most important place in the financing of urban construction, and particularly in the largest and most sensitive category of *residential* construction, our chief source of information is the Annual Report of the Secretary of the United States League of Building and Loan Associations, which in certain respects may be supplemented by the annual reports of the State Departments which have jurisdiction over such Associations. The Secretary's Report now becomes available in July of each year and the data given relate to the previous fiscal year of the respective state supervisory departments. In addition to number, membership and total assets of the Associations, the total of mortgage loans outstanding at the end of the year is reported for each state. Thus, at the end of 1930 the Associations numbered over 12,000, boasted over 12 million members, and had approximately 8¼ billion dollars of mortgage loans outstanding. However, only in about half of the states (this proportion has been increasing in recent years) are data available for the amount of mortgage loans made during the year. Furthermore, only in the case of a very few states are we given the important item of construction loans or the number of new homes whose construction has been made possible during the period by Building and Loan advances. It is true that estimates have been made from time to time by League officials, both as to total mortgage loans made during the year (showing, for instance, 2 billion dollars in 1927 and 1928) and as to the proportion of this total represented by construction loans. But while the first of these estimates is probably sufficiently accurate for practical purposes, the estimate that about 50% of all new loans is for the purpose of financing new construction is obviously a very crude one, taking no account, for instance, of the substantial differences that must exist as between the various phases of the building cycle.

With over 12,000 Associations in the field, many of them of very small size, it is probably too much to expect that adequate data can be made available on a monthly basis, though it would seem highly desirable to secure monthly reports on new construction loans and for at least the larger Associations in the densely populated areas this might not seem to be wholly beyond the bounds of practicability. Certainly, it should be possible to require from all Associations in their annual reports complete information in regard to total mortgage loans and total construction loans made during the year (with number of new homes financed) and every effort should be made to speed the time at which such information becomes available.

Perhaps better in quality but also similarly lacking in comprehensiveness are the statistics relating to the real estate lending activities

of the life insurance companies, the second most important source of funds for urban building purposes. The Association of Life Insurance Presidents reports as of the end of each year the total urban mortgage holdings (i. e., mortgages other than farm mortgages) of 52 leading companies whose combined assets now represent 91.8% of the total admitted assets of the legal reserve life insurance companies of the United States. As of the end of 1930, these 52 companies held $5,108,000,000[1] in such mortgages, or 29.4% of their total assets. On the assumption that the percentage relationship between urban mortgage loans and total assets of all life companies would be the same as for these 52 companies, we can estimate the total holdings of all life insurance companies at $5,564,000,000. This series is now available over a long period of years and gives an excellent picture of the trend of total life insurance company funds invested in urban real estate loans, but not of course of current lending activity. For a somewhat smaller group of companies (numbering 40 and having 81 or 82% of the total admitted assets of all companies), the Association of Life Insurance Presidents also reports holdings of urban mortgages (as well as of other investments) as of the end of each month. These statistics are published monthly in the Survey of Current Business.

Unfortunately, however, we have no data covering the volume of such loans made during each year. The increase in outstanding loans from one year to the next is the resultant of new loans made during the year plus extensions less retirements of or payments upon loans already on the books. It is important to know not only the aggregate amount of insurance funds used for urban mortgage credit but also the amount of new loans which insurance officials see fit to make each year—and indeed, if possible, month by month. Further, it would be valuable to know the different types of buildings upon the security of which such funds were loaned, for, unlike the Building and Loan Associations, the vast bulk of whose loans are based upon residential buildings, usually individual homes, the life insurance companies lend to an important extent upon larger residential projects, upon commercial and industrial structures, and in some cases upon hotels and other specialized structures. Of even more importance would be a differentiation between loans upon old structures on the one hand and loans upon construction in process or upon structures recently completed. Many, perhaps most, life insurance companies state that they do not accept construction loans —only a few of the larger companies are really equipped to make and supervise such loans. Yet a very large amount of new construction is financed by *temporary* construction loans in the hope or on the understanding that these temporary loans will be refunded by permanent insurance company loans when the construction process has been com-

[1] Preliminary estimate.

pleted. Were insurance funds not likely to be available, many of these structures would not be undertaken. To the extent that the temporary funds are advanced by banking institutions, such loans may be included in the banking statistics later to be discussed, but to an important degree they come from local mortgage companies, second mortgage companies, investing companies and private investors, and hence do not find their way into any published statistical records.

As the life insurance companies are relatively few in number, of large size and equipped with highly organized accounting and administrative staffs, it would not seem to be imposing an undue burden upon them to ask them to report monthly their total volume of new urban mortgage loans classified as to the chief types of buildings represented and as to whether the loans were based upon old structures, construction in process or recently completed structures. These data indeed would seem essential to the companies themselves in their own internal administration and in the determination of major investment policies. They would unquestionably make an important contribution to our understanding of conditions and trends in the real estate market.

Real estate financing statistics of *banking* institutions are among the least adequate and least reliable. In this field our chief source of information is, of course, the Annual Report of the Comptroller of the Currency. For National banks, the figures as to outstanding loans are complete and presumably accurate. The Comptroller's Report gives us the total of "real estate loans, mortgages, deeds of trust, and other liens on real estate" other than farm lands outstanding as of the date of each call—that is, four times a year—though no attempt is made to secure new loans made during the year nor the amount of such loans made to finance new construction.

From 1909 to 1915 the Comptroller of the Currency endeavored to collect the figures for state incorporated institutions direct from the banking institutions themselves. Since 1916 his statistics for such institutions have been based upon the reports compiled by the officials of the banking departments of the various states. They are, therefore, subject to all the limitations of inadequacy, non-uniformity of classification, etc., of these basic reports from 48 independent political jurisdictions. In particular, urban real estate loans are frequently not segregated from other loans—sometimes they are included under the general classification of "Unclassified Loans" or "All Other Loans," while in other cases they are apparently lumped with "Farm Loans." Moreover, the classification is not always uniform from year to year for a given state. Of course, the Federal Reserve Board publishes annually the mortgage holdings of all member banks but it would be impossible to use this report as the basis for an estimate of the holdings of all banks, particularly because the mutual savings banks, which rank

next to life insurance companies as a source of urban mortgage credit, are outside of the Federal Reserve System.

These mutual savings banks are particularly important in New York State, where they are allowed to invest up to 70% of their total assets in real estate mortgages and where on July 1, 1929, they had almost 3¼ billion dollars (or 64.4% of their total assets) so invested. In the Comptroller's Report for 1930, urban real estate loans are segregated for only 6 of the 17 Mutual Savings Bank States. In 8 cases, they are combined with "Farm Loans," while in the remaining 3 states they are lumped with "All Other Loans." As the farm loans made by the Mutual Savings Banks are admittedly a very small proportion of their total real estate loans, it is possible to make a satisfactory correction for the 8 states referred to. In those states which segregate farm and urban real estate loans, the percentage of farm to total real estate loans is less than ½ of 1%. A deduction of 5% from the total real estate loans of the 8 states would, therefore, seem to be a highly conservative allowance for this factor. As the 3 states which do not segregate real estate loans at all have only a very small amount of total loans outstanding, an estimate of their total urban real estate loans may be made without liability of measureable error by applying to their total loans the proportion which such loans bear to total loans in the case of all other states. On these bases, I estimate that the total outstanding urban real estate loans of the 606 Mutual Savings Banks in the United States was $5,287,000,000 on June 30, 1930. This is almost certainly a conservative estimate. For certain earlier years, the degree of segregation of real estate loans in the Comptroller's figures is much less great and the possibility of error in such estimates is greatly enhanced.

Loans made by State (commercial) banks were classified from 1919 to 1922. From 1923 to 1926 the urban real estate loans made by such banks in the Middle Western States were reported under unclassified loans. As the loans of this group in other years comprise about 80% of the total urban real estate loans for all State banks, any attempt to complete an historical series for State banks is attended by the possibility of large error. Thus, if the reported loans of the other States be multiplied by five to correct for the omission of Middle Western banks, the resulting figures show a trend that is erratic and unlike that of urban mortgage loans made by other classes of banks. Another method of correction is that used by Gray and Terborgh in their study of "First Mortgages in Urban Real Estate Finance." They first ascertain for each year the total of urban mortgage holdings for all states the reports of which segregate that item, then find what percentage this is of the total loans and discounts of those states, and, finally, apply this percentage to the total of loans and discounts for all states. The result is, of course, a very rough approximation but is undoubtedly more trustworthy than the Comptroller's reports, which do not

include anything for states not segregating. The method can be improved materially if the adjustments are made by geographic areas, rather than for the country as a whole. Thus, if one or two of the Pacific States do not segregate, their total of urban mortgage loans may be estimated with a reasonable degree of accuracy by applying to their figure of total loans the proportion which such urban loans bear to total loans in the five or six other Pacific States. Within homogeneous economic areas, lending practice can be assumed to be relatively uniform.

Since 1927 the Comptroller's reports have been somewhat more complete and this improved method may be applied with greater confidence than in the preceding four years. Thus, in the 1930 report, 12 states out of the 43 included segregated urban mortgage loans completely; 14 states separated real estate loans from other loans but failed to distinguish between farm and urban loans; and only 17 (of which 10 were Southern States, for which the figures were relatively small in any case) lumped real estate loans in the unclassified column. Serious error in the application of regional corrections such as described above is probable only in the case of the Middle Western States, where the segregation of farm loans from all real estate loans has to be made on the basis solely of figures for Wisconsin. However, as Wisconsin shows a relationship between farm and urban loans of 55 to 45, this adjustment is likely to underestimate the amount of urban loans held by State banks in Illinois, Ohio, Indiana, Michigan, etc. My estimate of total urban mortgage loans held by 13,582 State banks on June 30, 1930, is $1,198,000,000, which again is likely to err on the conservative side.

Precisely the same criticisms may be made of the Comptroller's figures for loan and trust companies, for private banks, and for stock savings banks, in which latter by the way are included the figures for the savings departments of the California departmental banks. Application of the above method to the Comptroller's reports for June 30, 1930, results in the following estimates of urban mortgage loans outstanding as of that date: 1,564 Loan and Trust Companies, $1,393,000,000; 714 Stock Savings Banks, $642,000,000; and 361 private banks, $3,500,000.

Adding these estimates to the estimated total of $5,287,000,000 for mutual savings banks, and $1,198,000,000 for state commercial banks, and the reported total of $1,176,000,000 for National banks, gives total urban mortgage holdings by all classes of banking institutions of $9,699,500,000 on June 30, 1930. This figure, it must be admitted, is highly "synthetic" and its only justification is that it appears to be an underestimate rather than an overestimate.

If it is so difficult to get adequate information in regard to total loans outstanding at the end of each year, it seems hopeless to look for further

classification of mortgage loans or for any indication of lending activity over shorter periods. In so far as the banks are concerned, we must apparently be content with annual totals of bank funds used for urban mortgage purposes and with net increases or increases year by year.

Turning from financial institutions which lend their funds directly for mortgage purposes to those institutions which tap the general investment market, we find our statistics still more uncertain as to quality and almost as inadequate in scope. Three series are available purporting to represent the volume of real estate securities offered to the investing public by real estate bond houses and investment dealers. All are available on a monthly basis and all show some attempt at classification of issues. The oldest of these series is that published since 1919 by the Commercial and Financial Chronicle, representing stock and long and short term bond issues in its so-called "Land and Buildings" group. A commendable effort has been made by the Survey of Current Business to segregate from the Chronicle's reports all long term bonds issued by mortgage bond houses and to classify these securities by purpose of issue and as to kind of structure. These classifications would be immensely valuable, if the compilation upon which they are based were reasonably complete. Comparison of the Chronicle's series, however, with the two independent series published by private real estate financing organizations seems to demonstrate that the Chronicle's statistics are lamentably incomplete. Even if controversy over definitions should lead us to discard the one which reports the highest totals, we find the other series showing annual totals averaging nearly 25% in excess of the Chronicle's figures, though it purports to cover only "long term real estate bonds, notes, collateral trust obligations and land trust certificates publicly advertised or announced," and even in this field its coverage is admittedly incomplete. Unfortunately this series dates back only to 1926 and consequently for purposes of historical analysis is of comparatively little use.

Difficulties of compiling such a series are great. Possible sources of issue are so numerous that compilers must depend on the indirect method of following offering advertisements or announcements in the daily newspapers, financial and real estate journals, etc. As the issues are frequently, if not indeed usually, small and local, this involves a heavy burden; unlike other security issues, attention cannot be limited to the press of the leading financial markets. Moreover, many hundreds of issues are sold "over the counter" to individuals or "placed" as a whole with banks or other financial institutions. In such cases no public advertising is likely to be done and only close contact with "the trade" would bring such issues to one's attention. Examination of published reports reveals many duplications usually because of changes in name of the issue, re-offering of unsold portions of old issues, etc. Finally difficulties of definition are always present,

particularly when an attempt is made to classify by purpose of issue or type of structure.

We probably cannot expect any private organization to surmount all these difficulties and for anything like satisfactory results must await the time when the Department of Commerce or the Federal Reserve Board will assume the burden of compiling adequate statistics on the volume of real estate security issues offered to the investing public.

Calculations of total volume of such credit outstanding based upon existing data are attended by grave risks. If I must make a *guess,* however, I would estimate that a par value of approximately 5 billion dollars of so-called "real estate bond issues" is now outstanding. This estimate is based on the assumption that $300,000,000 of such issues were outstanding in 1919, that 40% should be added to the Chronicle's figures to get approximately correct annual totals of new offerings in the next dozen years and that amortization and redemption averaged 5% through 1923 and 4% from 1924 to date. We may be more impressed with the conservatism and also perhaps with the rather flimsy character of this estimate if we recall the recent report of the Real Estate Securities Committee of the Investment Bankers Association. Stating that "estimates of the total outstanding volume of real estate bonds vary from eight to twelve billion dollars," they express their own opinion that "ten billion dollars may be a fairly correct estimate." I see no basis for such an estimate. In a letter to the writer the Chairman of this Committee explained the difference between his figures and mine by stating that published statistics usually "do not take into account most of the issues averaging about $150,000." Such issues are of considerable importance in Chicago and the mid-western area generally and they are frequently omitted from the record, but it is not believed that the omissions are sufficient to explain such a huge difference as the estimates show, particularly after 40% has been added to the Chronicle's reports primarily to take account of this very factor.

Mortgages made by local mortgage companies which were said to number 3,800 in 1926, present a difficult problem. To some extent they are sold to life insurance companies and other financial institutions and hence are already included in our statistics. To the extent also that they are offered in the form of bonds by public advertisement to the general public they may, or might, find their way into our compilation of real estate securities publicly advertised or announced. That portion, however, which is held by the mortgage companies themselves or which is sold over the counter in the form of individual mortgages would not get into the published records.

In somewhat similar position are the issues of the so-called guarantee companies. While the number of such companies is, or was, very large, the bulk of the business is done by a few large companies in the New York metropolitan area. At the end of 1930, for instance, four of

these companies had guaranteed mortgages or mortgage certificates outstanding amounting to $2,343,000,000 and their sales during the year had probably exceeded $500,000,000. However, as a considerable proportion of their issues are sold to other financial institutions and as another considerable proportion are publicly advertised in the New York papers, only a moderate percentage of their issues would escape inclusion in the reports already discussed. This percentage, however, would be larger in the case of the smaller guarantee companies outside New York City.

No comprehensive data are available in regard to the urban mortgage holdings of individual investors, trustees, educational and other institutions and none at all covering second mortgage securities, though in both cases the amounts are large.

At this point it may be interesting to summarize our estimates of the amounts of urban mortgage credit outstanding in various forms or in various classes of institutions:

Building and Loan Associations		$ 8,250,000,000
Life Insurance Companies		5,564,000,000
Mutual Savings Banks	$5,287,000,000	
Loan and Trust Companies	1,393,000,000	
State Banks	1,198,000,000	
National Banks	1,176,000,000	
Stock Savings Banks	642,000,000	
Private Banks	3,500,000	
Total Banks		9,699,500,000
Real Estate Bonds (Publicly Offered)		5,000,000,000
		$28,513,500,000

Thirty billion dollars would therefore seem to be a not unreasonable estimate of total urban mortgage credit outstanding.

Another vital aspect of the real estate market concerning which our data are of very little value is the matter of interest rates, or rather of the cost of urban mortgage credit—for interest rates and total cost are by no means the same thing. The market for building finance is a comparatively sluggish one. Interest rates on real estate mortgages change but slowly over a fairly long period of time. Adjustment to changing conditions of supply and demand for building capital is first effected through changes in underwriting discounts and expenses, which may vary over a rather wide range. Compilations of coupon rates on advertised issues therefore would in any case throw but little light on the real cost of mortgage money. Based on our inadequate records of real estate security issues, their defects are still further multiplied. These defects inhere in the series published monthly by the Survey of Current Business which shows the average coupon rates on the Chronicle's long term real estate bond issues offered by mortgage bond houses during the month. Moreover, as the real estate bond is so highly

variable a commodity, the series is characterized by erratic short term fluctuations due merely to the different proportions in which issues of varying qualities happen to be combined in the monthly periods. Thus the declining tendency of the series in 1930 is an indication not of easing money conditions in the real estate market but rather of the fact that difficult conditions had driven out of the market all but the most conservative lenders and all but borrowers of the highest quality. A satisfactory series would probably require the rating of issues and the calculation of average coupon rates for security groups or classes, each of approximately uniform quality. Occasional information in regard to the state of the mortgage market and the prevailing range of rates for funds in various districts is published by the National Association of Real Estate Boards. We have also such studies as that of the Institute of Research in Land Economics and Public Utilities which show gross yields earned by the mortgage investments of the leading life insurance over a period of years. These yields, however, relate to all loans on the companies' books and are not an indication of current market conditions.

While the inadequacies of the basic data again make complete accuracy impossible, the Chronicle's reports probably provide sufficiently accurate information for studies of changing trends in the *form* of credit instruments. In other words, at least for the larger publicly advertised issues, it is possible to analyze such problems as the change from serial to sinking fund issues, policies in regard to amortization, the use of the land trust certificate or the collateral trust device, preferred and common stock issues, and so forth.

Data in regard to foreclosures, defaults, losses and other financial involvements would be interesting and valuable as indicators of the development of unsound situations or tendencies, though in some cases they might become available too late to make preventive action yield important results. Unfortunately, our information is of the most sporadic and unsystematic type and probably always will be so. Foreclosure data are now compiled in a few cities and one of the committees of the National Conference on Construction has recently added to our sum of information by a field investigation of the current situation in Chicago and the Pacific Coast. But a great deal of "digging" in the public records would be necessary to provide the basis for any broad statistical analysis. Defaults, at least in interest payments, could be compiled for real estate securities, which have received wide public distribution but they are not yet being regularly and systematically collected. Defaults on mortgages held by financial institutions will, of course, be unavailable because regarded as confidential. Estimates of the amount of mortgage securities in default with further estimates as to the probable ultimate losses from such securities have recently been made for Cook County and for the country as a whole by the

Real Estate Securities Committee of the Investment Bankers Association. For Cook County these estimates may be reasonably accurate, but for the country as a whole they seem to be the merest guesses and are rendered worthless by what seems to be, as we have already seen, a serious exaggeration of the total volume of such securities outstanding in the hands of the public. Statistics in regard to failures of Building and Loan Associations, with an estimate of the losses involved, are published in the Annual Report of the Secretary of the Building and Loan League. How accurate the estimate of losses may be, I have no means of judging.

In conclusion, may I summarize the suggestions which I have made, explicitly or by inference, for the improvement of our basic statistics relating to the financing of urban building activity:

1. Segregation by the Building and Loan Associations of construction loans from other loans and publication of the totals of new loans made classified by purpose of issue, and preferably on a monthly basis, at least by a representative group of the larger Associations.
2. Monthly reports by the leading life insurance companies showing new loans made classified by class of structure and purpose of issue.
3. Requirement by the State Banking Departments that all banking institutions segregate urban mortgage loans from all other classes of loans in their annual reports which become the basis of the Comptroller of the Currency's Annual Report.
4. Assumption by the Federal Reserve Board or the Department of Commerce of responsibility for the collection of monthly statistics relating to mortgage securities offered to the general investor, with adequate classification by purpose of issue, kind of structure, and possibly also location of structure and type of issuing house.
5. Preparation by the Federal Reserve Board or the Department of Commerce of an improved index of interest rates on real estate security issues.
6. Regular and systematic collection by one of the organizations named above or by the financial reporting services of data in regard to defaults on real estate security issues in the hands of the investing public.

Needless to say, these suggestions represent the basis of a minimum program only.

THE EFFECTS OF DEFICITS IN NATIONAL SAVINGS

By M. C. Rorty

The equation of exchange, when critically examined, states only the most obvious of truisms—yet it is one of most useful of all tools for the analysis of economic phenomena. Ultimate progress in economic statistics may, in fact, depend very largely upon the development of other somewhat similar equations representing necessary balances and relations between economic factors. For example, in the analysis of the flow of the national income, it is possible to assume such flow to be observed, in whole or in part, at varying points, and to write corresponding equations for income and outgo. We can, if we wish, study the flow in terms of the receipts and expenditures, and the capital gains and losses, of corporations and other business organizations—or we may write our analysis from the standpoint of the sum total of the incomes and disbursements of indiviudals. In either case, the relations between economic factors may be expressed in forms appropriate to the viewpoint that is adopted.

If we wish to carry this type of analysis into a field of very pressing current interest, it should not be impracticable to express, in mathematical terms, the methods whereby fluctuations in business activity and in employment may be controlled and any necessary expansions of economic activity may be brought about.

This last suggestion opens up, however, a very wide and somewhat contentious area of discussion, into which this brief paper will not attempt to venture. The purposes of the present paper are much simpler and narrower—first, to suggest the general importance of developing other economic equations than that of exchange into tested and generally accepted forms; and, second, to indicate a specific application of the principle of economic balances to the analysis of the current domestic and international financial positions of England, France, and Germany.

As to the latter purpose, the key to an interpretation of recent trade and financial phenomena in England, France, and Germany appears to lie in the changing relations, in each country, of the national savings to the national scale of new capital expenditures. In this respect we are concerned only with the differences between savings and capital expenditures, and not with the absolute values of the two items. The latter values are very difficult to determine, and perhaps, at the best, can only be approximated. The differences can, however, be determined with considerable exactness by indirection.

For this indirect determination, it is necessary to write the equation of balance for the factors involved. To simplify this equation for our

special purpose, we may omit various minor items and may assume no increases or decreases in governmental debts or in bank credit. On this basis we have, for any given period, "National savings, plus net loans and investments received from abroad, equals domestic new capital expenditures." For debtor nations the second item is a positive figure and represents foreign contributions toward the cost of domestic improvements. For creditor nations, or perhaps more exactly for nations that are currently improving their credit position, this same item is a negative figure, and represents the excess of national savings over domestic requirements for new capital, which excess is almost automatically converted into added foreign credit balances and investments.

As a further development of the preceding equations, we may consider the relations between changes in foreign loans and investments (including balances on current account), and changes in commodity trade balances. As to these relations, it will be clear that, if other factors in the balance of international payments remain unchanged, ***any increase or decrease in commodity trade balances must be reflected by an exactly equal change in loans, investments, and balances on current account.***

All the preceding may seem too rudimentary to justify discussion before a serious scientific gathering. This would surely be the case, were it not for the fact that the most obvious and simple problems of individual finance tend to take on an appearance of complexity when they appear in identical form in a national or international accounting. However, the fudamental importance of the analysis becomes clearer when we translate our equations into concrete interpretations of recent developments in England, France, and Germany, and into equally concrete conclusions as to the future.

Our principal equation suggests, in general, that no nation can suffer a substantial loss in national savings, that is not offset by a corresponding decrease in capital requirements, without such loss being reflected in a weakened international banking and exchange position. This is particularly true of nations that ordinarily occupy creditor positions in the field of international finance.

Applying the preceding indication specifically to the German situation, it would appear that the primary cause of the recent financial difficulty was that Germany, which normally should have a moderate surplus of national savings over and above its domestic capital requirements of about 12 billion marks per annum, had in fact, for a number of years, been falling several billions of marks short of these domestic requirements, and to meet this deficit had systematically been borrowing abroad, first at long term and finally at short term.

The case of Germany is, however, less significant than that of England. The makers of the Young Plan had clearly recognized that deficits in the German national savings must exist for several years,

and had expected that Germany must borrow abroad in substantial amounts until able to supply her new capital requirements out of her own national savings. The extreme severity of the present depression, combined undoubtedly with a certain measure of mishandling of affairs in Germany, have operated to upset these calculations—but at least there seems to have been no fundamental misapprehension as to the economic factors involved.

With respect to England, it would appear, however, that there has been a very serious failure to recognize certain fundamental economic necessities. We have in this case no reports of the Agent General for Reparations, or Wiggin report, to give us statistical details. However, the indications are still plain that England's national savings had been reduced by labor union restrictions and exactions, and by excessive taxes on wealth and the higher incomes, to a point where they would not support the minimum requirements for domestic capital and for those foreign advances to which England was committed by reason of her special international banking position. It seems rather clear, furthermore, that England's suspension of gold payments was due, fundamentally, to the cumulative effects of this deficit in national savings, and that the credit crisis which appeared to be the immediate cause of the suspension was, after all, a mere incident in the situation.

The English situation is emphasized in contrast with that in France. In France, the total of the national savings might very seriously have been reduced by the effective writing-down of mortgages and interest bearing obligations to about 1/5th of their pre-war gold values. However, the habit of thrift is widespread throughout the French population, and it seems entirely probable that reductions in interest charges had little effect on the nation's savings. The former receivers of interest may have saved less, but those who previously paid the interest saved more.

As a further element in maintaining the total of the French national savings it would appear that the administration of the income tax laws in France is comparatively lax, and that, in particular, the super-tax features of such laws are relatively ineffective. In any case, the evidence is clear that there has been no lack of savings in France and that the outstanding domestic and international strength of that country has been the direct product of an ample national savings fund.

If the preceding point of view is correct, the first requirement for economic recovery in England is the re-establishment of an adequate national savings fund. It might be desirable for this fund to be built up from the proceeds of widely distributed popular savings, but the development of popular habits of thrift is a slow process. Immediate relief must, therefore, be sought mainly in the rebuilding of the savings fund in pre-war directions, i.e. through permitting a substantial reinvestment of the larger incomes. The breaking of the economic deadlock

between wages and prices, by the suspension of gold payments, will help in so far as it may tend to restore industrial profits and to increase individual incomes from dividends. Reductions in taxes, made possible by reductions in the "dole," or otherwise, will be a further help. But the essential and inescapable requirement appears to be a reduction in income taxes, particularly in the super-tax range, and a shifting of a very substantial burden of taxation directly or indirectly to consumption.

Directly related to the preceding, is the question of the change in England's trade balances that may result from depreciation in the gold value of the pound. If we can trust the indications of our equations, the results of this depreciation will be to produce very temporary and minor changes in England's trade position, except in so far as they may reflect increases in England's national saving fund. The effects of the depreciation on England's trade balances up-to-date have, certainly, been disappointing to those who expected a radical improvement—and there is little doubt that these results will continue to be disappointing, regardless of further currency depreciation, until England's system of taxation of incomes is overhauled. In any case, neither with respect to England nor to other countries that recently have gone off the gold standard, need we, in the United States, fear that currency depreciation will make possible a flooding of our markets by foreign goods. The fear of such flooding is recurrent in such cases, but the flood never comes—and our equations of economic balance seem to indicate why they never can come.

A final suggestion, arising from our consideration of these foreign conditions with respect to the national savings funds, may be that we, in this country, are approaching the danger point in current proposals for increased taxation of the higher incomes. It is very difficult to justify even the present individual income tax rates and exemptions on any basis of reasoned social or economic theory. A further concentration of taxes on the higher incomes will very certainly be nothing but a vicious pandering to the worst weaknesses of democracy. This, however, will be no political argument—but there may be more hope for sanity in income taxation, if it can be realized that such taxation, when carried to extremes, may readily bring about chronic business depression through the throttling and diversion of the national savings.

SOME FUNDAMENTAL CONCEPTS OF MATHEMATICAL STATISTICS

By B. H. CAMP

[The author found it necessary to reduce somewhat the list of topics he had originally intended to discuss. A title more appropriate to the present paper would be: *Definitions of Probability, and Allied Topics.*]

Probability. The section on probability will be published in the *American Mathematical Monthly.* A very brief summary follows. It is never really necessary in statistics to consider probability when the number of elements is infinite. When the number of elements is finite there are two logically tenable definitions: the limit definition, according to which one supposes that the same set of antecedent events would not always produce the same result; and a definition based on the idea of balanced causation, in which one supposes that the same set of antecedent events would always produce the same result. These definitions, if carefully stated, are self consistent, but not consistent with each other; they rest on mutually exclusive philosophies, and both may not be assumed true at the same time.

*Significance.** A careful consideration of the logical basis of various tests for significance would make it clear that one cannot escape the typical problem to which R. A. Fisher applied the idea of "likelihood." Two examples may suffice. (*a*) E. L. Thorndike has shown that, subject to certain apparently reasonable hypotheses, the distribution of intelligence in children is normal. His final evidence consists of a very large sample, or combination of samples, which fits a normal curve so well that, when the chi test is applied, P equals 0.999. Assuming, now, that no error has been made in the way the test has been handled, would it be justifiable to say, as Fisher does in like cases, that this result is too good to be true; in fact, that Thorndike's hypothesis is put in jeopardy when P equals 0.999 just as truly as if P were 0.001? (*b*) There are in a bag 1,000,000 balls, of which 1,000 are white, a less number red, a still smaller number yellow, and so on, the numbers decreasing in some convenient manner, let us say, in proportion to the terms of some point binomial. The probability of choosing at random a white ball is 0.001. If I draw a ball and find that it is white, must my hypothesis be put in jeopardy? These two examples, (*a*) and (*b*), lead to different conclusions because of a difference in the character of the hypotheses which may reasonably be supposed to have been in the mind of the experimenter at the outset. It is with the relative validity of alternative hypotheses that the subject of likelihood deals.

* For a thorough discussion of significance and likelihood, the reader is referred to a paper by J. Neyman and E. S. Pearson, *Biometrika*, volume XX (1928), *pp.* 175-240.

Likelihood. Let $f(x,m)$ denote a probability distribution, describing a universe from which a random sample,

$$x_1, x_2, \ldots, x_n,$$

has been drawn. The letter m denotes a parameter whose value is to be determined as well as possible from the sample. The a priori probability that, for a given m, this sample would be obtained is

$$\prod_{i=1}^{n} f(x_1, m)\ f(x_2, m)\ \ldots\ f(x_n, m) \qquad (1),$$

and this is what R. A. Fisher terms the *"likelihood of m."* The "optimum" value of m is the solution of the equation of maximum likelihood,

$$d\,\Pi/dm = o \qquad (2).$$

Criticism. This approach to the problem seems to the author to be a good one chiefly because of certain results that have been obtained from it, not so much because of an a priori or intrinsic excellence. Also, the method has been frequently misunderstood and misrepresented. First, it is claimed that likelihood is a "measure of confidence." Confidence is a vague, subjective thing, certainly as difficult to define as probability itself, and would seem to be better left out of the picture. Besides, one would sometimes violently disagree with the conclusion that the optimum solution does give the result to be preferred. A simple example in which this is true is the typical a posteriori problem in which there are a number of urns containing black and white balls. If it is known that a ball has been chosen at random from one of these urns, and that the ball is white, the optimum solution tells us that the urn in question contained only white bals. This is doubtless the result to be preferred on certain hypotheses with regard to the distribution of the urns, but not on others. Precisely this difficulty is involved in many, if not in all, problems where the optimum solution is invoked; but usually it is well concealed; without always knowing it we are frequently making a tacit assumption equivalent to the "equal distribution of ignorance."

A second objection is to the word "likelihood." The so-called likelihood of m has nothing whatever to do with the probability of m, and it is therefore difficult to justify a term which in every other connection is recognized as the closest synonym of probability. This so-called likelihood is really that property of m which permits it to produce certain results; this property might be termed its ability, power, competence, or capacity. Efficiency would be a good term if Fisher did not employ that for another purpose. Fertility has almost exactly the meaning desired, but it has a biological connotation. Of the words available the word potency probably expresses most nearly the meaning desired, and it is accordingly suggested that it would be

better if this word should be adopted instead. Hereafter, in this paper, then, potency shall be defined as the product Π indicated in (1), and equation (2) will be referred to as the equation of maximum potency.

It has been stated that this method of determining m is not necessarily the best method. Certain other methods will be suggested presently; but first it is to be noted that the idea is not altogether new. When Gauss and other early writers wished to determine the parameters of a curve so that it would best fit observations, they chose those parameters which would satisfy the equations of maximum potency in the special sense that the probability of the observed deviations ("errors") should be a maximum. Then, subject to a normal hypothesis, they were led to the method of least squares. It should also be noted that the function, likelihood or potency, is not, as frequently stated, a new kind of mathematical entity. Fisher says that it "is not a differential element and is incapable of integration," but clearly he does not mean that Π as a function of m is non-integrable. That would be impossible, since it is defined throughout the entire range of m and even has a derivative everywhere. He merely means that integration of it does not yield, as in summing probabilities, a new value of the potency which pertains to any value of m in the interval of integration. Were it not for the pernicious connotation of the word "likelihood," nobody would make the mistake of expecting such a result. One may, in fact, desire to compute the integral as in the following problem. Suppose we select, as the best value of m, not the value for which Π is a maximum, but the center of that interval (of prescribed length, depending on the accuracy of the observations) within which the mean potency is a maximum. To obtain the mean potency it would be necessary to integrate Π. In many types of problems, this suggested method seems to the author superior to the method of maximum potency. Suppose, for example, a surveyor measures a base line several times, and desires to know what value to select finally. He is not truly interested in a precise value x, but in an approximate value, or an interval, $x \pm e$, (where e is perhaps as small numerically as $0.000\ 01x$). A still better method for him would seem to be to select that interval within which the least value of Π is a maximum. Then he could be assured that a slight variation in the value chosen for x would not affect Π as seriously as it would had he chosen some other interval.

Fisher's theory presupposes (as he states) that the problem is one of "estimation"; to discover from the sample the most suitable values of the parameters in a *prescribed* form of universe. He assumes, for example, that we know in advance that the frequency curve is of Type III, and it is only the parameters that are unknown. Often, however, we are trying to discover, not the most suitable parameters for a

predetermined form, but the most suitable form. Then the relative frequencies that occur in the sample are to be regarded themselves as observations of the ordinates of the curve (or surface) to be discovered, and we have a problem like the one Gauss had, and are accordingly led to the method of least squares, or, with a different weighting, to the method of least chi square. This last method is nearly the same as the method of maximum potency in certain cases, but neither this method nor the method of least squares will give the same results as the method of maximum potency in general; in particular, not when the theoretical universe is normal and the parameter to be chosen is its center.

It is not, then, on idealistic grounds that one would choose the method of maximum potency, but rather for pragmatic reasons: it leads to useful results. Two important results are the following. (i) It always leads theoretically to so-called efficient statistics, that is, to statistics having the least possible sampling variance, although frequently the equations cannot actually be solved for these statistics. Indeed, when sufficient statistics exist, the method always leads also to them. Sufficient statistics are those which contain all the relevant information in the sample. (ii) The method leads to statistics whose variance can be found (subject to one or two conditions) by a second differentiation, and this is true even though the equations cannot be solved for the statistics themselves. Then, although one may not know the exact form of the efficient statistic, one may measure the efficiency of any arbitrarily chosen statistic.

AN INDEX OF UNEMPLOYMENT AND PART-TIME EMPLOYMENT IN PHILADELPHIA, PENNSYLVANIA

By EMMETT H. WELCH

The demand for information in regard to the extent of unemployment and part-time employment in Philadelphia during the current depression has resulted in an attempt being made by the Industrial Research Department to estimate monthly the number of Philadelphia wage earners who are unemployed and employed part time. These estimates are based on employment indexes compiled and made available by the Philadelphia Federal Reserve Bank and on the surveys of unemployment which have been taken by the Industrial Research Department in co-operation with the Bureau of Compulsory Education of the Philadelphia Board of Education.

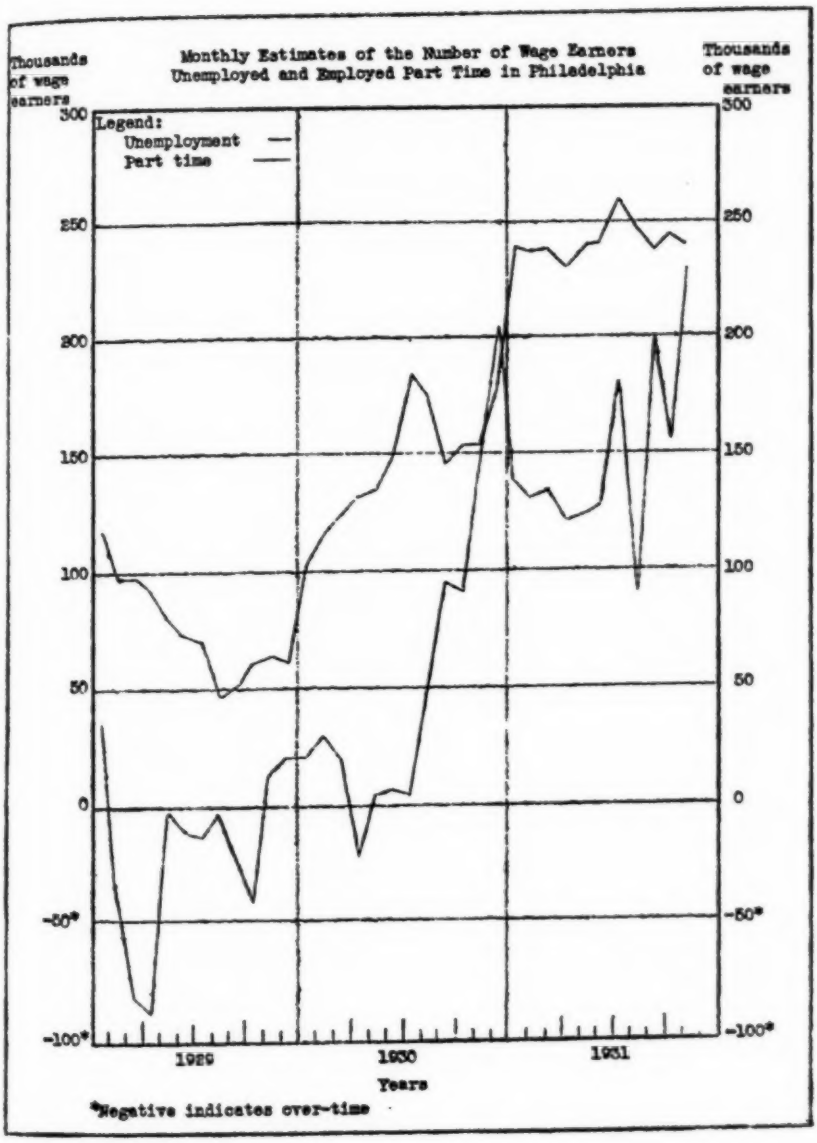
Changes in the Number of Gainful Workers Unemployed and Employed Part Time in Philadelphia, 1929 to Date

The tables below show the monthly estimates of the number of Philadelphia wage earners unemployed and employed part time from January 1929 to date. The first eight months of 1929 show a decrease in the number of unemployed wage earners from 120,000 in January to 48,000 in August. In the twelve-month period from August 1929 until July 1930 every month, except December, shows a larger number of unemployed than the preceding month. The slight decrease in unemployment in December, 1929, is due to the fact that employment in retail and wholesale trade, stimulated by Christmas shopping, increased more than enough to offset the decrease in factory employment. The increase in unemployment during this twelve-month period amounted to 136,000, bringing the number of unemployed wage earners in July, 1930, to 184,000. The average monthly increase in unemployment was over 11,000 during this period.

August and September, 1930, show a decline in the number of unemployed, September being 39,000 below July. From 145,000 unemployed wage earners in September, 1930, the number rose rapidly to 238,000 for January, 1931. The first eleven months of 1931 show little change from month to month. The largest number of unemployed so far in the present depression was 260,000 in July, 1931.

Comparison of Fluctuations in Unemployment and Part-Time Employment

Unemployment and part-time employment have increased in absolute numbers by about the same amount over the period January 1929 to date. The general movement of the two curves is similar, although


Thousands of wage earners
Monthly Estimates of the Number of Wage Earners Unemployed and Employed Part Time in Philadelphia
Thousands of wage earners
Legend:
Unemployment
Part time
300
250
200
150
100
50
0
-50*
-100*
1929
1930
1931
Years
*Negative indicates over-time

the timing is different. The changes in unemployment take place more gradually and with more uniformity of direction than the changes in part-time employment. There are several factors which would lead one to expect this condition. In the first place, employers are likely to change the working time of a large number of their employees at one time, while they are likely to use the lay-off more gradually unless an entire department or plant is closed down. Secondly, part-time employment is a much more flexible means of changing output than is the lay-off. Finally, it is likely that many employers use the lay-off only as a last resort. For these reasons, it is reasonable to expect greater fluctuation in part-time employment than in unemployment.

MONTHLY ESTIMATES OF THE NUMBER OF UNEMPLOYED WAGE EARNERS IN PHILADELPHIA

January 1929—November 1931

	Number (in thousands)		
Month	*1929*	*1930*	*1931*
January	120	104	238
February	98	117	237
March	98	126	238
April	93	132	230
May	82	135	240
June	73	150	241
July	71	184	260
August	48	173	247
September	52	145	237
October	62	154	244
November	64	154	241
December	62	181	241
Average	77	146	240

MONTHLY ESTIMATES OF THE NUMBER OF WAGE EARNERS EMPLOYED PART TIME IN PHILADELPHIA

January 1929—November 1931

	Number (in thousands)		
Month	*1929*	*1930*	*1931*
January	36	22	138
February	—42*	32	132
March	—82	18	134
April	—88	—22	122
May	— 2	4	124
June	—12	6	128
July	—14	4	180
August	— 4	56	86
September	—24	94	202
October	—40	92	146
November	14	140	188
December	22	206	134
Average	—20	54	144

*Negatives indicate over-time

Many of the month-to-month changes in unemployment and part-time employment are inverse to each other. It is not unreasonable that this condition should exist in a period of recession or depression. It was pointed out above that reduced working time is likely to be generally resorted to before lay-off. When workers are laid off, therefore, they are likely to be already working part time; so the effect would be to decrease part-time employment, when unemployment is increased. On the other hand, when additional workers are placed on the pay-roll, an increase in part-time employment is certain unless all of them are immediately placed on full-time employment.

The month-to-month changes in part-time employment from May to November 1931 have been particularly violent, while the estimated number of wage earners totally unemployed has remained relatively stable throughout the first eleven months of 1931. This shows rather conclusively that recent changes in demand for labor in Philadelphia have been taken care of very largely by changing the working time of persons already on the pay-roll, rather than by laying off or hiring additional workers.

Method of Estimating Monthly the Number of Unemployed Wage Earners in the City of Philadelphia

The monthly estimates of unemployment presented in this report were obtained by the following procedure:

1. A weighted composite index of employment for Philadelphia was computed, using the following indexes of employment compiled by the Federal Reserve Bank of Philadelphia:
   - Index of employment in manufacturing industries—Philadelphia
   - Index of employment in wholesale trade—Pennsylvania
   - Index of employment in retail trade—Pennsylvania
   - Index of employment on street and electric railways—Pennsylvania

   Three of the indexes used are for the state of Pennsylvania rather than for Philadelphia. This procedure was necessary because employment indexes for Philadelphia are not yet available for those three series. It is believed, however, that the state indexes for these three types of employment are reasonably representative of Philadelphia, particularly since the state indexes are heavily weighted by Philadelphia concerns.

   Approximately 487,000 or 54.7 per cent of the city's wage earners are employed in the four pursuits represented by these indexes of employment. The weights used in combining these four indexes into a composite weighted index for the city were chosen with a viewpoint not only of giving weight to the relative number of wage earners in each of the four employment

pursuits represented by the indexes, but also of making the composite index representative of all the wage earners in the city. The extent to which this attempt has been successful will appear later when the estimates of unemployment are compared with the results of the various surveys and censuses of unemployment which have been taken in Philadelphia since 1929.

2. The composite weighted index of employment was related to April 1929 as 100 per cent.
3. The estimated number of wage earners employed each month was calculated by multiplying the monthly composite weighted index by 797,000. This figure was obtained in the following manner. In the April 1929 survey of unemployment, 10.4 per cent of the wage earners enumerated in the city were unemployed. Applying 10.4 per cent to the 890,000 wage earners in the city as reported in the 1930 census of population, the number of unemployed wage earners in the city in April 1929 is found to be 93,000, and the number employed 797,000.
4. The estimated number of wage earners employed each month was deducted from 890,000 to obtain the monthly estimates of unemployment.

Comparison of Unemployment Estimates with Census and Surveys of Unemployment

The estimates of unemployment presented in this report agree rather closely with the results of the surveys and censuses taken since April 1929. The estimate for April 1929, of course, is identical with the survey of unemployment on that date, because this survey was used as a basis for estimation. For April 1930, the estimate is 132,000, while the survey taken by the Industrial Research Department resulted in a figure of 133,000. For April 1931, the estimate is 230,000, while the department's survey shows 228,000. Thus the results of the two surveys of unemployment taken by the Industrial Research Department since April 1929 are practically identical with the estimates for the months when the surveys were taken.

In December 1930, the estimate is 180,000 as compared with 222,000 obtained by the Metropolitan Life Insurance Company survey. This wide difference is not as serious as it would at first appear, for the reason that from December 1930 to January 1931, the estimated number of unemployed increased from 180,000 to 236,000. The Metropolitan survey was taken only among its policyholders; it is very possible that the group included in this survey was affected by the December to January increase in unemployment sooner than the group affected by the composite employment index. In the special census of unemployment taken in January 1931, by the United States Bureau of the Census, 23.8 per cent or 212,051 of Philadelphia's wage earners

were "out of a job, able to work, and looking for a job" (Class A), and "3.9 per cent or 34,673 had jobs but were on lay-off without pay, excluding those sick or voluntarily idle" (Class B). Adding these two groups together we obtain 246,724 or 27.7 per cent as the total Class A and Class B unemployment. Since this total includes part, but not all of the employees working part-time, as well as those totally unemployed, the 236,000 estimate of the number totally unemployed in January 1931, appears very nearly correct. From the comparisons which have just been made between the estimates of unemployment presented in this report, and the results of the censuses and surveys, it would appear that the method of estimating is valid.

Definition of Unemployment

The term "unemployed" as used throughout this report refers to wage earners, or persons who are usually gainfully employed, but who, because of temporary illness or inability to find work, are unemployed. Persons permanently disabled or incapable of employment at their usual gainful occupation are not counted as wage earners, hence are not included among the unemployed. The number of persons falling within the above definition of unemployment who are unemployed for reasons other than inability to find work is small, particularly at a time like the present.

Method Used in Estimating Part-Time Employment

In making the estimates of part-time employment, the following data were used:

1. Index of employee-hours—Philadelphia Federal Reserve Bank.
2. Weighted index of employment—Philadelphia Federal Reserve Bank.
3. Monthly estimates of unemployment.
4. Surveys of unemployment.

The steps in obtaining the estimates are as follows:

1. The index of employee-hours was related to April 1931 as 100 per cent.
2. The number of employed wage earners was obtained by subtracting the monthly estimates of unemployment from 890,000, the number of gainful workers reported in the 1931 census of population.
3. The employee-hours index, with April 1931 equal to 100 per cent, was multiplied by 599,000. How this figure was obtained will be explained below.
4. The monthly items obtained in step 3 were subtracted from the corresponding monthly items obtained in step 2. This difference was then doubled.

The monthly items obtained by step 4 represent the estimated number of workers who were working part-time if the result is posi-

tive, and they represent the number who were working over-time, if the result is negative. It should be borne in mind that the above estimates are worked out on the basis of a constant degree of part-time employment, namely half-time. In the April 1931 survey of unemployment, it was found that the average degree of part-time employment was one-half of full-time employment. The average degree was obtained in this fashion; the persons working part time were asked whether the number of hours which they were employed per week represented 1/6, 2/6, etc., of the number of hours generally considered to be full time in the occupation or industry in which they were engaged; when the average of all these fractions was taken, it was found to be .4999 or practically one-half. The only possible way of estimating the number of persons employed part time on a basis of employee-hours is to assume a constant degree of part-time employment. Furthermore, comparisons between the number of persons employed part time in various months are meaningless unless the estimates are expressed in a common unit.

Some additional explanation of the basis for the above method of estimating part-time employment is necessary. In order to make the several steps clear, I shall use algebraic symbols.

Let:

Fo = the number of wage earners employed full time in the base month, April, 1931.
Fi = the number employed full time in any other month.
Po = the number of wage earners employed part time in the base month.
Pi = the number employed part time in any other month.
FHo = the total number of employee-hours of all full-time workers in the base month.
FHi = the total number of employee-hours of full-time workers in any other month.
PHo = the total number of employee-hours of part-time workers in the base month.
PHi = the total number of employee-hours of part-time workers in any other month.
k = the average number of employee-hours in a month of full-time employment.
½k = the average number of employee-hours in a month of part-time employment. (Since part-time employment is held constant at one-half of full-time)

then:

$$\frac{FHi + PHi}{FHo + PHo} = \text{the employee-hours index for any month.}$$

$$(1)\quad \frac{FHi + PHi}{FHo + PHo} = \frac{Fi\,(k) + Pi\,(\tfrac{1}{2}k)}{Fo(k) + Po(\tfrac{1}{2}k)} = \frac{Fi + \tfrac{1}{2}Pi}{Fo + \tfrac{1}{2}Po}$$

(2) Fo + Po = the number on pay-roll in base month.

(3) Fi + Pi = the number on pay-roll in any other month.

In order to illustrate how formulas 1—3 are used in connection with the various steps in the method outlined above, I shall go through the process of estimating the number of wage earners employed part time in January 1931. In April 1931 there were, based on the survey of unemployment, 538,000 wage earners in Philadelphia employed full time and 122,000 employed part time; therefore, Fo = 538,000, and ½Po = 61,000. The employee-hours index for January 1931 was 97.3, based on April 1931 as 100 per cent.

Substituting these values in formula (1) we get:

$$\frac{Fi + \tfrac{1}{2}Pi}{538{,}000 + 61{,}000} = .973, \text{ therefore,}$$

(4) Fi + ½Pi = .973 (599,000) = 583,000

In January, 1931, there were 652,000 wage earners on pay-rolls in Philadelphia, therefore:

(5) Fi + Pi = 652,000

Solving equations (4) and (5) simultaneously, we find that ½Pi = 69,000 and Pi, therefore, equals 138,000. The actual calculation is considerably simplified when the operations are carried out as outlined in steps 2—4 of the method outlined above.

LIFE TABLES FOR PATIENTS WITH MENTAL DISEASE

By BENJAMIN MALZBERG

Mental diseases are often the direct consequences of physical processes, as in general paralysis. In other cases, there is an association of physical and mental elements even though the relation may not be one of cause and effect. It is also true, however, that the mental condition is in itself an important factor in the morbidity and mortality of patients with mental disease. An obvious illustration of this is seen in the exhaustion which so often results from prolonged periods of excitement in the manic depressive psychoses. There are also indirect results consequent upon bad personal attitudes toward health, such as the marked indifference of dementia praecox patients to the need of exercise and their lack of attention to matters of personal hygiene. For these reasons one would anticipate higher rates of mortality among the mentally diseased. Indeed, as measured in the usual manner, the death rate among patients with mental disease appears to be seven or eight times higher than that among the general population.

Since the proportion of the population suffering from mental disease has increased rapidly in recent decades, the higher rates of mortality among the insane population must have had an unfavorable effect upon the general mortality rates. It is well known, for example, that the increase in the expectation of life has not been manifested equally throughout the life span. Thus, whereas the expectation of life at birth among males in the State of New York increased from 45.6 years in 1901 to 52.8 years in 1920, an increase of 15.8 per cent, the corresponding expectations at age 22 were 38.6 and 41.4 years, respectively, an increase of only 7.2 per cent. At 32 years of age the expectation of life increased 6.8 per cent during the same interval; at 57 years of age the increase amounted to only 3.2 per cent, and declined still further to 0.9 per cent at age 62. Beyond this age to the end of the life span, the expectation of life actually decreased. The results for females are in general the same as for the males. These facts are well known, and constitute one of the anomalies in public health. For whereas the control of infantile and child diseases, and the great decline in tuberculosis and other zymotic diseases have lowered the death rates throughout the earlier part of the life span, the result has been to increase the effects of the so-called degenerative diseases at later ages. Increased death rates resulting from circulatory diseases, nephritis and cancer have received close study, but until recently it had not been sufficiently noted that mental diseases are very closely associated with morbidity and mortality in these later age intervals. The rate of mental disease

increases very rapidly with age, especially past middle life. Consequently by increasing the expectation of life in the lower half of the life span, we add to the number who become mentally diseased in the later years of life. When to the great number of patients with mental disease under treatment in hospitals, we add the unknown, though undoubtedly significant total of the mentally ill outside of hospitals, it is apparent that their differential rates of mortality must be considered as contributory factors in the general mortality. In this study, therefore, we shall attempt to measure as accurately as the available data permit, the rates of mortality and the expectation of life among patients with mental disease, limiting the analysis necessarily to an institutional population, since there are no similar data relative to the non-institutional insane.

The primary statistical problem revolves about the index of the rate of mortality. Several measures have been in use. One related the deaths to the population in the institution at the beginning of the year. Another used the total number of patients under treatment during the year as the equivalent of the total annual exposures. Both methods have been severely criticized in recent reports dealing with mental patients in State hospitals, issued by the Bureau of the Census.* It was pointed out that the use of the population at the beginning of the year results in an underestimation of the number of annual exposures, and consequently increases the death rate. By using the total number under treatment during the year, we, on the other hand, overestimate the annual exposures, thereby decreasing the death rate. Furthermore since the total under treatment depends upon the rate of turnover, a hospital with few admissions would, other things being equal, present a higher death rate than one with frequent admissions and discharges.

If we were enabled to follow a large population of mentally diseased patients through life, we could obtain correct rates of mortality as follows. Suppose that we began with a population of 100,000, all aged exactly 20 years. If we traced the histories until all had died, we would have the total deaths in the age group 20 during the first year of exposure, the total in the second year occurring at age 21, etc., to the end of the generation. The ratio of the deaths in a year in any age group to the population alive at that age at the beginning of the year, would represent the exact rate of mortality at that age. In practice it is impossible to obtain such a record, even in the case of a normal population. The situation is complicated still further, in the case of the insane, by the fact that the same group is not under continuous observation for even a single year. Some of those present at the beginning of the year are discharged in the course of the year; those admitted during the year are under exposure for varying parts of the year. It is therefore necessary to arrive at an indirect measure of the number

*See for example, Mental Patients in State Hospitals, 1926 and 1927, page 28.

of *annual* exposures which in conjunction with the number of deaths will give the rate of mortality.

In its recent publications* the Bureau of the Census has determined the equivalent number of full-time patients by use of the formula $T = P + \frac{1}{2}(A - D)$ where P represents the number of patients present at the beginning of the year, A the number of admissions. and D the number of discharges during the year. This is based upon the theory that the patients present at the beginning of the year remain for the entire year, except for the discharges from that group, and that the admissions and discharges are present, on the average, six months. The assumption that each discharge has an average exposure of six months is a very doubtful one, and probably results in reducing slightly the total of full time patients, and therefore exaggerates the mortality rate. In any event, it would be impossible to apply the formula directly to the present study, owing to the fact that detailed statistics of this type are not available for individual ages. If, however, we assume that the error is slight (as it probably is) and that the hospital population increases in the course of the year in accordance with a linear trend (an assumption which is very justifiable) then we may adjust the preceding formula so as to obtain the hospital population at the middle of the year.** The theoretical value thus obtained should agree with the observed population at the middle of the year. This is the basic assumption which we have utilized in determining the population at each age level.

The data of this study consist of a total of 12,599 deaths in the New York civil State hospitals, of whom 6,433 were males and 6,166 females, the deaths occurring during the three fiscal years beginning July 1, 1928 and ended June 30, 1931. The age distribution of the resident population was taken as of April 1, 1930, in connection with the federal census of that date, each of the New York civil State hospitals submitting a schedule to the statistical bureau of the State Department of Mental Hygiene for each resident patient. For our calculations we required the resident population at the middle of the fiscal year 1929-1930, namely on January 1, 1930. This was available for the total resident population, but the latter was not distributed according to age. This was obtained on the assumption that the age distribution on January 1, 1930 was relatively the same as that shown by the census on April 1, 1930. As only three months had elapsed, it is hardly possible that any significant change could have occurred in the age constitution of the

*Ibid. page 27.

**For let P' = the population at the end of the year, and P'' the population at the middle of the year. $P' = P + A - D - d$, where d is the number of deaths. In an arithmetic progression $P'' = \frac{P+P'}{2} = \frac{P+P+A-D-d}{2} = P + \frac{1}{2}(A-D) - \frac{d}{2} = T - \frac{d}{2}$

resident population. On January 1, 1930, there were 22,030 males and 24,295 females resident in the State hospitals.

Both the population and the deaths were grouped into quinquennial age intervals, beginning with a group aged 5 to 9 years. Pivotal central values were obtained at ages 17, 22, 27, etc., and the corresponding rates of mortality computed in the usual manner from the formula $q_x = \frac{2m_x}{2+m_x}$, where q_x is the rate of mortality at age x and m_x is the central death rate. The mortality rates at intervening years were obtained by osculatory interpolation, the procedure being that adopted by Mr. George King, the English actuary, and illustrated by him in his report on life tables, issued as a supplement to the seventy-fifth annual report of the Registrar-General of Births, Deaths and Marriages in England and Wales.

Owing to the small numbers involved, the rates of mortality under 17 years of age can hardly be considered reliable, and it was therefore deemed advisable to begin the life tables at age 20. Towards the close of the life span, the rates are again unreliable, especially for the males, due to the few cases involved, and possibly to errors in the reporting of age. But the effect on the expectation of life can hardly be serious, up to at least 75 years of age, since the heavy mortality in the preceding years will have reduced the life table populations to such small totals, that the subsequent errors, if any, in the number of expected deaths at ages 75 and over could not affect the preceding values significantly.

The rates of mortality are summarized in Table I, and are shown graphically on Chart I on page 164.

Among male patients with mental disease the rate of mortality is

TABLE I

Rates of Mortality Per 1,000 Population

Age (years)	*Patients with Mental Disease, 1930*		*Population of State of New York, 1920*	
	Males	*Females*	*Males*	*Females*
22	45.51	55.78	5.38	5.28
27	35.82	51.02	6.27	6.60
32	38.26	42.51	7.39	6.74
37	43.82	40.80	8.41	6.73
42	52.13	45.35	10.04	8.11
47	59.56	47.83	12.69	10.66
52	72.77	54.99	17.11	14.40
57	88.92	68.49	24.83	21.42
62	113.92	90.20	34.53	29.64
67	171.58	122.08	50.09	46.70
72	267.28	171.86	73.08	69.40
77	337.95	241.47	105.93	98.63
82	436.50	334.23	156.03	140.30
87	494.04	450.14	206.86	199.05

48.02 per 1,000 at 20 years of age. The rate then declines for a series of years, reaching a minimum of 35.49 at 28 years of age. Thereafter the rate increases steadily through each interval to a rate of 494.04 at 87 years of age. Female patients interestingly enough, have a higher rate of mortality than males at the younger ages. They begin with a rate of 57.37 at 20 years of age, compared with a rate of 48.02 among males. The rate among females then declines, as in the case of the males, to a minimum of 40.63 at age 36. At 35 years of age the rate among males exceeds that of the females for the first time, and from that point to the end of the life span, the female mortality rate, though it rises steadily, is much lower than that of the males. For the purpose of comparison, we have introduced the mortality rates for males and females in the State of New York in 1920, this being the latest available data for New York. The rates among patients are so much higher as to necessitate no detailed comment.

Certain elements should be noted in connection with the mortality rates among patients with mental disease. In the first place, the resident population is reduced in the course of the year by the paroling of patients, who represent a group selected because of a favorable

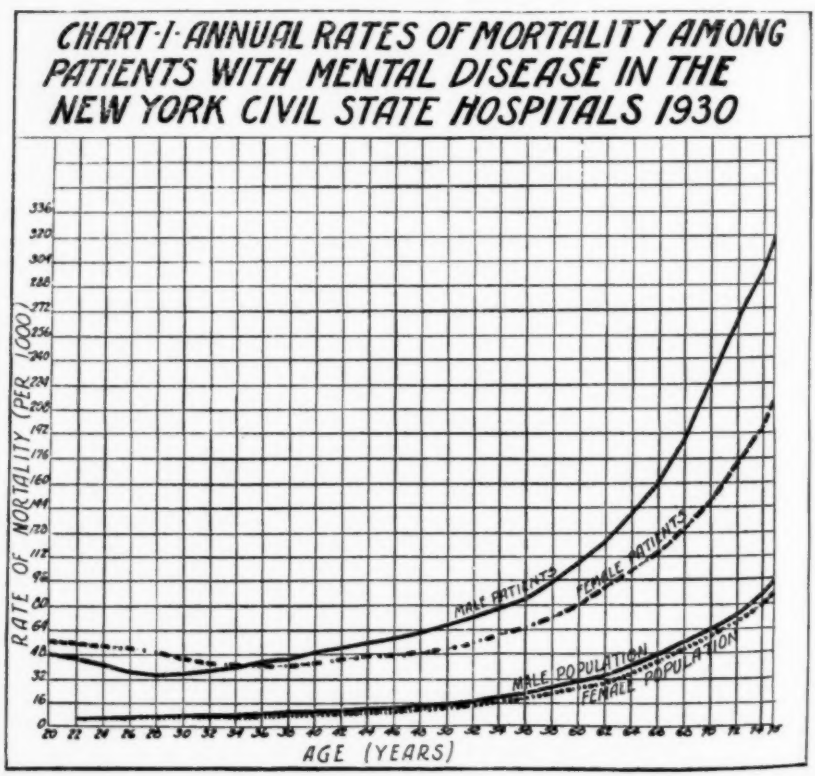


CHART-I-ANNUAL RATES OF MORTALITY AMONG PATIENTS WITH MENTAL DISEASE IN THE NEW YORK CIVIL STATE HOSPITALS 1930
RATE OF MORTALITY (PER 1,000)
AGE (YEARS)
MALE PATIENTS
FEMALE PATIENTS
MALE POPULATION
FEMALE POPULATION

prognosis. It is unlikely that many deaths occur among paroles. Consequently if this group had been included in the total exposures for the year, the mortality rates would have been reduced accordingly. On the other hand, the resident population also represents a selection. It consists primarily of the accumulation of old and chronic cases, among whom there are relatively few deaths, compared with the great number which occur among the admissions who represent acute cases. The number of expected deaths in the hospital population is therefore greatly reduced. This more than counterbalances the unfavorable effect on mortality rates resulting from the use of parole. We may therefore feel confident that the high rates of mortality are not statistical exaggerations. The differences in mortality rates in a group of first admissions, and in a relatively stabilized resident population must be insisted upon. For, if as suggested earlier, we could have begun our analysis with a large group of first admissions, all of the same age, the presence of the great number of acute cases among them would inevitably increase their mortality rates, as compared with those shown in the present study.

We should also note the contrasting pictures shown by the two sets of curves on Chart I. Whereas, in the general population, the death rate of the males constantly exceeds that of the females, in the case of the patients with mental disease the female death rates are in excess up to the 34th year. Again the mortality rates in the general population rise steadily from 20 years of age to the end of the life span, but the rates among the patients decline for several years after 20 years of age, the period of decline being of longer duration in the case of the females. This may be adequately explained by the nature of the distribution of the populations according to psychoses. Thus the death rates at the younger ages are greatly influenced by the presence of patients with manic-depressive psychoses, in which the attacks tend to be acute rather than chronic and the death rates relatively high. The females greatly exceed the males among the manic-depressives, both among admissions and among resident patients. This, therefore, tends to increase their death rates, and it is not until the other psychoses begin to be represented in the population in significant numbers that the trend changes.

Another method of measuring the mortality rates is to consider the numbers dying within stated age intervals. Thus, in the first five years of exposure, beginning in each case at 20 years of age, 20,522 male patients and 25,010 female patients die, compared with only 2,841 males and 2,899 females in the general population of the State of New York in 1919-20, according to the Foudray abridged life tables. Among the patients, 25% will have died at 26 years of age among the males, and at 24 years among the females. For the general population in 1920 the corresponding ages were 52 and 54. Fifty per

cent will have died at ages 36, and 33 among male and female patients respectively, whereas these ages would have been 66 and 68 in the general population. Seventy-five percent will have died at ages 49 and 48 among male and female patients respectively, whereas the corresponding ages are 76 and 77 for the general population. By reference to Chart II, it will be noted that in the general population, the females exceed the males in number, practically throughout the life span. In the case of the patients, the males are in excess up to the 53rd year, the females exceeding the males thereafter. This is due to the heavier mortality of the females at the younger ages.

The values for the expectations of life are summarized in Table II, and are shown graphically in Chart III.

For the male patients, the expectation of life at age 20 is 19.17 years, and decreases steadily thereafter to a minimum of 1.48 at age 87. For females the expectation of life is 18.06 years at 20 years of age, which is 1.11 years less than that for the males at the same age. The expectation decreases to a minimum of 1.22 years at 91 years of age. The expectation of life is lower among females than among males

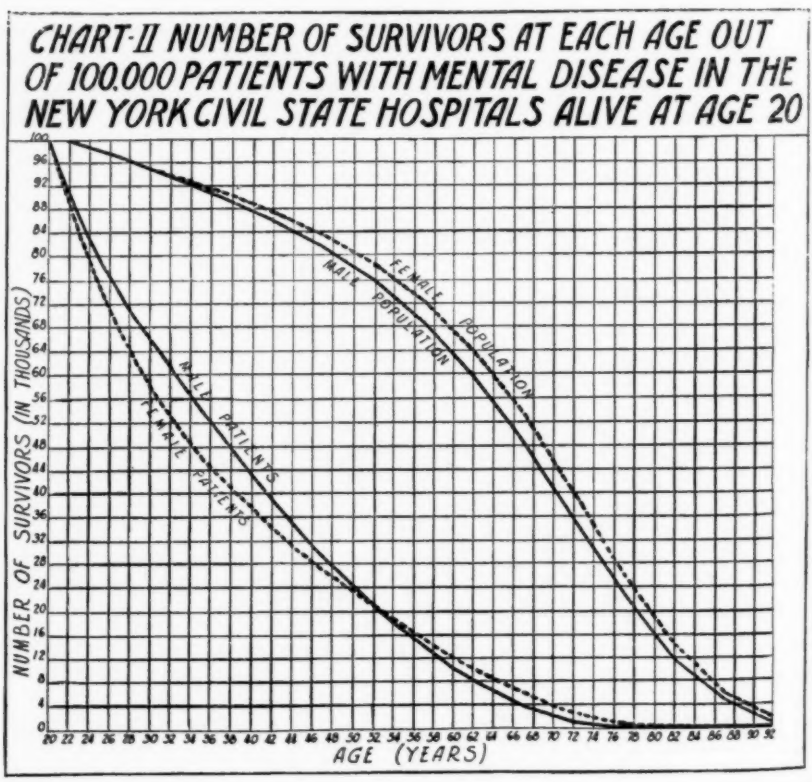


CHART II NUMBER OF SURVIVORS AT EACH AGE OUT OF 100,000 PATIENTS WITH MENTAL DISEASE IN THE NEW YORK CIVIL STATE HOSPITALS ALIVE AT AGE 20
NUMBER OF SURVIVORS (IN THOUSANDS)
AGE (YEARS)
MALE POPULATION
FEMALE POPULATION
MALE PATIENTS
FEMALE PATIENTS

TABLE II

Expectation of Life (in Years)

Age (years)	*Patients with Mental Disease, 1930*		*Population of State of New York, 1920*	
	Males	*Females*	*Males*	*Females*
22	19.02	18.18	41.40	42.98
27	17.96	18.28	37.54	39.19
32	16.10	17.67	33.74	35.44
37	14.21	16.26	29.98	31.57
42	12.40	14.61	26.25	27.63
47	10.67	12.86	22.59	23.79
52	8.92	10.92	19.08	20.11
57	7.17	8.97	15.83	16.68
62	5.46	7.16	12.88	13.52
67	3.98	5.53	10.22	10.71
72	2.84	4.15	7.94	8.40
77	2.21	3.02	6.00	6.48
82	1.75	2.21	4.38	4.85
87	1.48	1.60	3.07	3.50

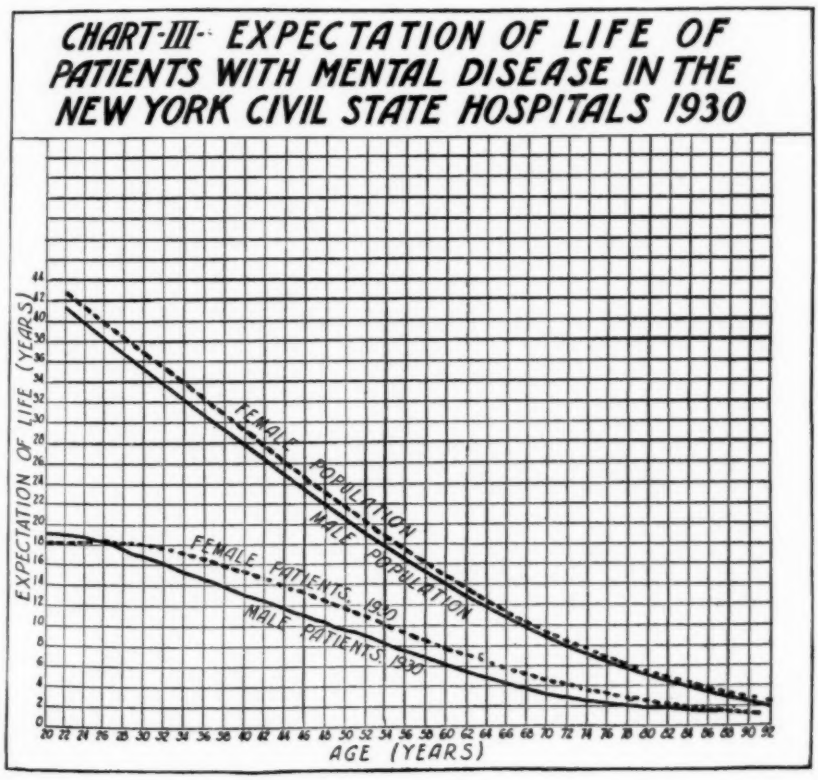


CHART-III- EXPECTATION OF LIFE OF PATIENTS WITH MENTAL DISEASE IN THE NEW YORK CIVIL STATE HOSPITALS 1930
EXPECTATION OF LIFE (YEARS)
AGE (YEARS)
FEMALE POPULATION
MALE POPULATION
FEMALE PATIENTS 1930
MALE PATIENTS 1930

until 26 years of age, when the expectations are 18.30 and 18.25 years for females and males respectively. From this year to the end of the life span the females have a higher expectation of life. The lower expectation of life among females at the earlier years is a consequence of their greater mortality during these years, as previously indicated. These expectations among patients with mental disease may be compared with those among the general population of New York State, as computed by Miss Foudray for 1919-20. At age 22, the males had an expectation of 41.40 years, the females 42.98 years, compared with 19.02 and 18.18 years for male and female patients respectively. At every age the general population has an expectation of life from two to three times as great as that among the patient population. Whereas the male patients have a greater expectation than females at the earlier years, in the general population the females have a higher expectation throughout life. It is also important to note that among the general population, the span of life is estimated at about 105 years, whereas among the patients with mental disease the heavy mortality results in the male population disappearing at 87 years, and the female at 91, an extremely significant reduction in the life span.

Our results may now be summarized as follows:

(1) The rates of mortality at corresponding ages are from 3 to 6 times as great among patients with mental disease as among the general population.

(2) The higher rates of mortality result in a very rapid reduction in the life table populations of the patients with mental disease, 25 per cent dying in from 4 to 6 years, 50 per cent in from 13 to 17 years, and 75 per cent in from 28 to 29 years. In the general population, the corresponding periods would be about 32, 48 and 56 years, respectively. Such heavy mortality results in a reduction of approximately 18 years and 14 years in the life spans of the male and female patients, respectively.

(3) There are significant differences in the direction of the trends of the mortality rates in the early years, rates among patients decreasing, whereas those in the general population increase steadily.

(4) The male patients have an expectation of life of 19.17 years at 20 years of age, compared with 18.06 years among females. At 22 years of age, the expectations are 19.02 and 18.18 years for males and females respectively. In the general population, in 1920, the corresponding expectations at age 22 were 41.40 and 42.98 years.

TABLE III

Life Table for Male Patients in the New York Civil State Hospitals, 1930

Age Interval (years)	*Of 100,000 Male Patients Alive at Age 20*		*Annual Rate of Mortality per Thousand*	*Expectation of Life (Years)*
Period of Life-time Between Two Exact Ages	*Number Alive at the Beginning of Age Interval*	*Number Dying in Age Interval*	*Number Dying in Age Interval Among 1,000 Alive at Beginning of Age Interval*	*Average Length of Life Remaining to Each One Alive at Beginnning of Age Interval*
x to $x+1$	l_x	d_x	$1{,}000q_x$	e_x°
20-21	100,000	4,802	48.02	19.17
21-22	95,198	4,452	46.77	19.11
22-23	90,746	4,130	45.51	19.02
23-24	86,616	3,737	43.14	18.91
24-25	82,879	3,401	41.04	18.74
25-26	79,478	3,128	39.36	18.52
26-27	76,350	2,923	38.28	18.25
27-28	73,427	2,630	35.82	17.96
28-29	70,797	2,513	35.49	17.61
29-30	68,284	2,443	35.77	17.24
30-31	65,841	2,402	36.48	16.86
31-32	63,439	2,371	37.38	16.48
32-33	61,068	2,336	38.26	16.10
33-34	58,732	2,298	39.12	15.72
34-35	56,434	2,264	40.12	15.34
35-36	54,170	2,234	41.24	14.96
36-37	51,936	2,206	42.48	14.58
37-38	49,730	2,179	43.82	14.21
38-39	47,551	2,155	45.32	13.84
39-40	45,396	2,133	46.99	13.47
40-41	43,263	2,109	48.74	13.11
41-42	41,154	2,077	50.48	12.75
42-43	39,077	2,037	52.13	12.40
43-44	37,040	1,985	53.58	12.06
44-45	35,055	1,927	54.96	11.71
45-46	33,128	1,869	56.43	11.37
46-47	31,259	1,818	58.15	11.02
47-48	29.441	1,754	59.56	10.67
48-49	27,687	1,711	61.79	10.31
49-50	25,976	1,670	64.29	9.96
50-51	24,306	1,629	67.00	9.61
51-52	22,677	1,584	69.85	9.26
52-53	21,093	1,535	72.77	8.92
53-54	19,558	1,473	75.31	8.58
54-55	18,085	1,402	77.51	8.24
55-56	16,683	1,336	80.06	7.89
56-57	15,347	1,284	83.64	7.53
57-58	14,063	1,250	88.92	7.17
58-59	12,813	1,206	94.16	6.82
59-60	11,607	1,162	100.08	6.48

TABLE III (Continued)

Age Interval (years)	*Of 100,000 Male Patients Alive at Age 20*		*Annual Rate of Mortality per Thousand*	*Expectation of Life (Years)*
Period of Life-time Between Two Exact Ages	*Number Alive at the Beginning of Age Interval*	*Number Dying in Age Interval*	*Number Dying in Age Interval Among 1,000 Alive at Beginning of Age Interval*	*Average Length of Life Remaining to Each One Alive at Beginnning of Age Interval*
x to $x+1$	l_x	d_x	$1{,}000q_x$	$\mathring{e}_x$
60-61	10,445	1,141	106.67	6.14
61-62	9,304	1,060	113.92	5.78
62-63	8,244	1,005	121.85	5.46
63-64	7,239	944	130.46	5.15
64-65	6,295	880	139.73	4.85
65-66	5,415	810	149.67	4.55
66-67	4,605	738	160.28	4.26
67-68	3,867	663	171.58	3.98
68-69	3,204	600	187.24	3.70
69-70	2,604	538	206.70	3.44
70-71	2,066	471	227.90	3.21
71-72	1,595	397	248.77	3.01
72-73	1,198	320	267.28	2.84
73-74	878	248	282.65	2.69
74-75	630	189	299.79	2.54
75-76	441	141	319.84	2.42
76-77	300	99	328.90	2.32
77-78	201	68	337.95	2.21
78-79	133	48	357.31	2.09
79-80	85	32	380.05	1.97
80-81	53	21	402.47	1.88
81-82	32	13	420.88	1.80
82-83	19	8	431.58	1.75
83-84	11	5	436.54	1.70
84-85	6	3	454.74	1.63
85-86	3	1	467.82	1.58
86-87	2	1	481.12	1.53
87-88	1	1	494.04	1.48

TABLE IV

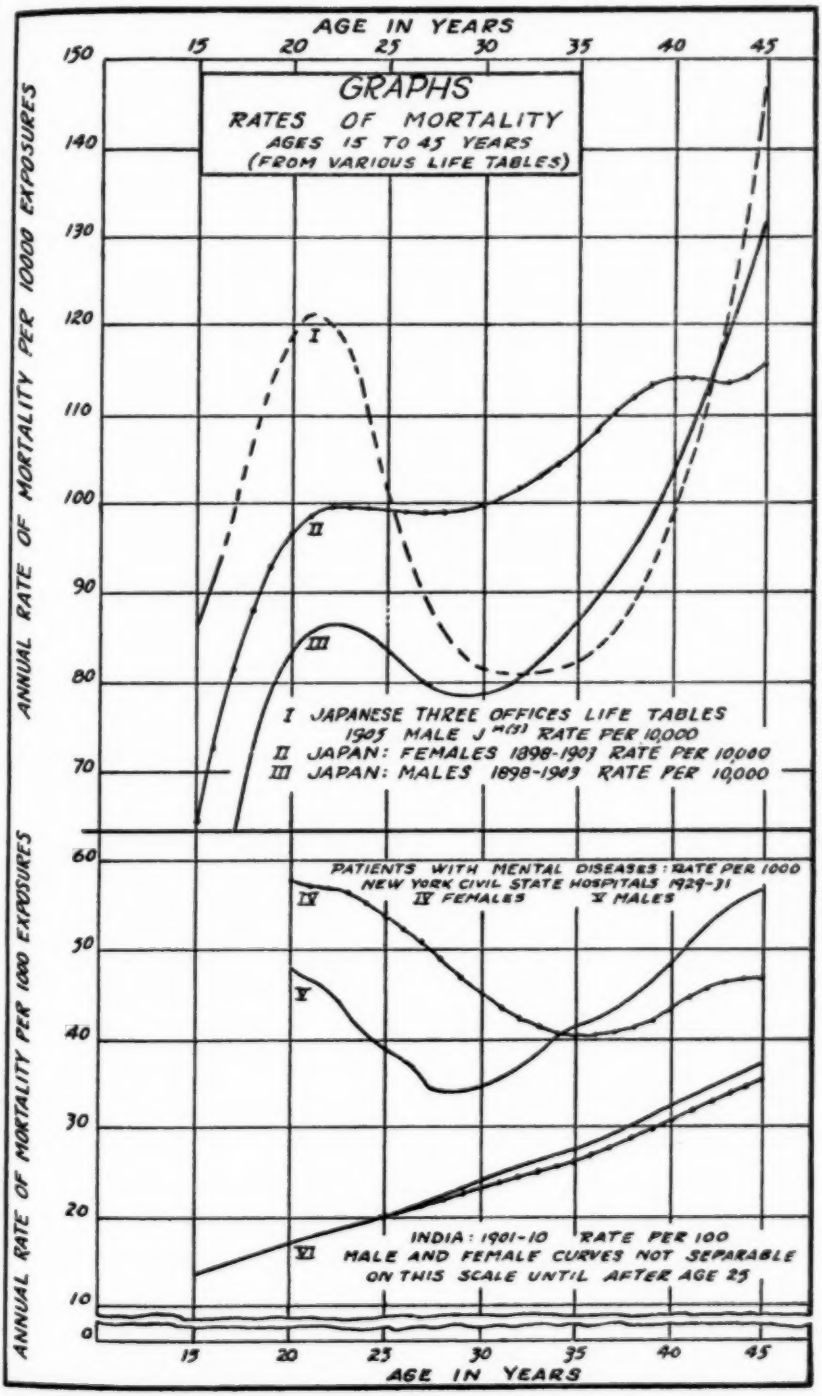
Life Table for Female Patients in the New York Civil State Hospitals, 1930

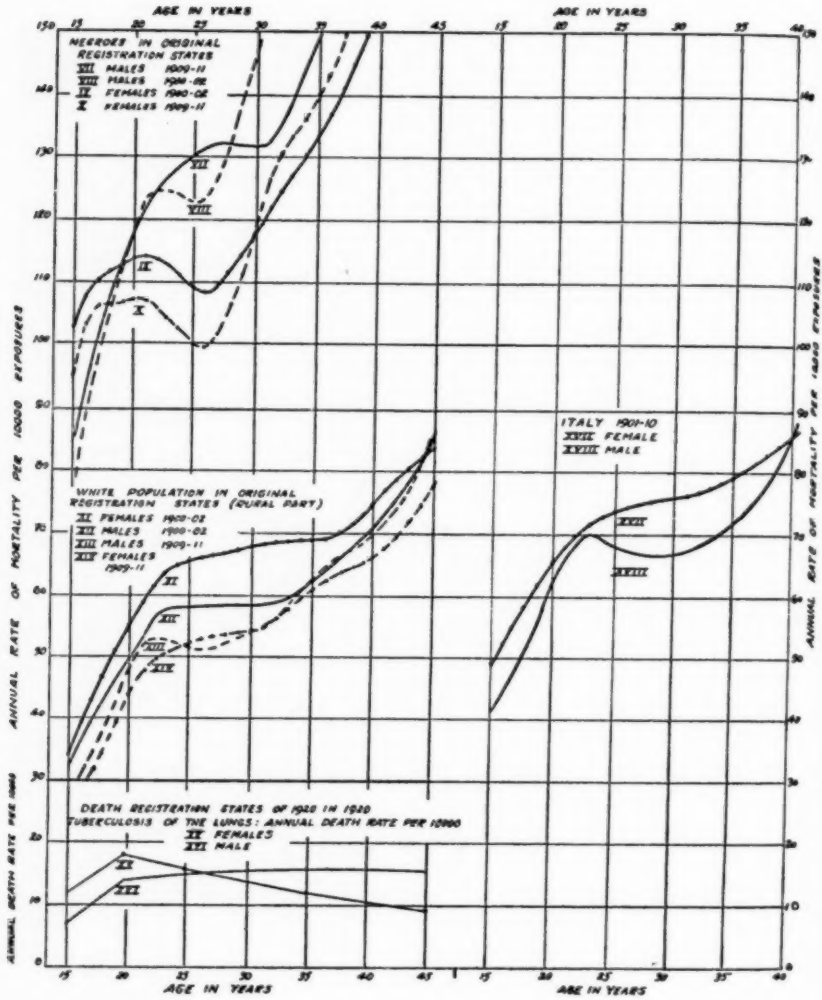
Age Interval (years)	*Of 100,000 Female Patients Alive at Age 20*		*Annual Rate of Mortality per Thousand*	*Expectation of Life (Years)*
Period of Lifetime Between Two Exact Ages	*Number Alive at the Beginning of Age Interval*	*Number Dying in Age Interval*	*Number Dying in Age Interval Among 1,000 Alive at Beginning of Age Interval*	*Average Length of Life Remaining to Each One Alive at Beginnning of Age Interval*
x to $x+1$	l_x	d_x	$1{,}000q_x$	e_x°
20-21	100,000	5,737	57.37	18.06
21-22	94,263	5,323	56.47	18.13
22-23	88,940	4,961	55.78	18.18
23-24	83,979	4,654	55.42	18.23
24-25	79,325	4,335	54.65	18.27
25-26	74,990	4,019	53.59	18.29
26-27	70,971	3,715	52.34	18.30
27-28	67,256	3,431	51.02	18.28
28-29	63,825	3,156	49.45	18.24
29-30	60,669	2,885	47.56	18.16
30-31	57,784	2,635	45.60	18.04
31-32	55,149	2,397	43.46	17.88
32-33	52,752	2,242	42.51	17.67
33-34	50,510	2,103	41.63	17.44
34-35	48,407	1,987	41.04	17.17
35-36	46,420	1,890	40.71	16.89
36-37	44,530	1,809	40.63	16.58
37-38	42,721	1,743	40.80	16.26
38-39	40,978	1,694	41.34	15.93
39-40	39,284	1,661	42.27	15.60
40-41	37,623	1,632	43.38	15.26
41-42	35,991	1,601	44.47	14.93
42-43	34,390	1,560	45.35	14.61
43-44	32,830	1,507	45.90	14.28
44-45	31,323	1,449	46.26	13.94
45-46	29,874	1,392	46.60	13.59
46-47	28,482	1,341	47.07	13.23
47-48	27,141	1,298	47.83	12.86
48-49	25,843	1,263	48.86	12.48
49-50	24,580	1,230	50.05	12.09
50-51	23,350	1,201	51.45	11.71
51-52	22,149	1,176	53.08	11.31
52-53	20.973	1,153	54.99	10.92
53-54	19,820	1,133	57.15	10.53
54-55	18,687	1,113	59.54	10.13
55-56	17,574	1,093	62.19	9.74
56-57	16,481	1,074	65.16	9.36
57-58	15,407	1,055	68.49	8.97
58-59	14,352	1,035	72.14	8.60
59-60	13,317	1,013	76.09	8.23

TABLE IV (Continued)

Age Interval (years)	Of 100,000 Female Patients Alive at Age 20		Annual Rate of Mortality per Thousand	Expectation of Life (Years)
Period of Lifetime Between Two Exact Ages	Number Alive at the Beginning of Age Interval	Number Dying in Age Interval	Number Dying in Age Interval Among 1,000 Alive at Beginning of Age Interval	Average Length of Life Remaining to Each One Alive at Beginning of Age Interval
x to $x+1$	l_x	d_x	$1{,}000q_x$	$\mathring{e}_x$
60-61	12,304	989	80.39	7.86
61-62	11,315	963	85.08	7.51
62-63	10,352	934	90.20	7.16
63-64	9,418	901	95.64	6.82
64-65	8,517	863	101.36	6.49
65-66	7,654	823	107.55	6.16
66-67	6,831	781	114.39	5.84
67-68	6,050	739	122.08	5.53
68-69	5,311	693	130.56	5.23
69-70	4,618	646	139.80	4.94
70-71	3,972	595	149.83	4.67
71-72	3,377	543	160.71	4.40
72-73	2,834	487	171.86	4.15
73-74	2,347	432	184.14	3.90
74-75	1,915	378	197.17	3.67
75-76	1,537	324	210.85	3.44
76-77	1,213	273	225.12	3.23
77-78	940	227	241.47	3.02
78-79	713	185	259.88	2.83
79-80	528	148	280.93	2.64
80-81	380	115	302.05	2.48
81-82	265	85	320.67	2.34
82-83	180	60	334.23	2.21
83-84	120	43	355.56	2.08
84-85	77	29	377.82	1.94
85-86	48	19	401.00	1.82
86-87	29	12	425.11	1.71
87-88	17	8	450.14	1.60
88-89	9	4	476.10	1.49
89-90	5	3	502.99	1.40
90-91	2	1	530.80	1.31
91-92	1	1	559.54	1.22

ANNUAL RATE OF MORTALITY PER 1000 EXPOSURES ANNUAL RATE OF MORTALITY PER 10000 EXPOSURES


GRAPHS
RATES OF MORTALITY
AGES 15 TO 45 YEARS
(FROM VARIOUS LIFE TABLES)
AGE IN YEARS
15 20 25 30 35 40 45
ANNUAL RATE OF MORTALITY PER 10000 EXPOSURES
150 140 130 120 110 100 90 80 70
I
II
III
I JAPANESE THREE OFFICES LIFE TABLES 1905 MALE J m(3) RATE PER 10,000
II JAPAN: FEMALES 1898-1903 RATE PER 10,000
III JAPAN: MALES 1898-1903 RATE PER 10,000
ANNUAL RATE OF MORTALITY PER 1000 EXPOSURES
60 50 40 30 20 10 0
PATIENTS WITH MENTAL DISEASES: RATE PER 1000
NEW YORK CIVIL STATE HOSPITALS 1929-31
IV FEMALES V MALES
IV
V
VI
INDIA: 1901-10 RATE PER 100
MALE AND FEMALE CURVES NOT SEPARABLE
ON THIS SCALE UNTIL AFTER AGE 25
15 20 25 30 35 40 45
AGE IN YEARS


AGE IN YEARS
NEGROES IN ORIGINAL REGISTRATION STATES
VII MALES 1909-11
VIII MALES 1901-02
IX FEMALES 1900-02
X FEMALES 1909-11
WHITE POPULATION IN ORIGINAL REGISTRATION STATES (RURAL PART)
XI FEMALES 1900-02
XII MALES 1900-02
XIII MALES 1909-11
XIV FEMALES 1909-11
ITALY 1901-10
XVII FEMALE
XVIII MALE
DEATH REGISTRATION STATES OF 1920 IN 1920
TUBERCULOSIS OF THE LUNGS: ANNUAL DEATH RATE PER 10000
XX FEMALES
XXI MALE
ANNUAL RATE OF MORTALITY PER 10000 EXPOSURES
ANNUAL DEATH RATE PER 10000

ABSTRACT
ALCOHOLIC MENTAL DISEASE BEFORE AND AFTER PROHIBITION

By FREDERICK W. BROWN

This paper is an attempt to discover certain facts with regard to the relative prevalence of alcoholic mental disease, before and after the Wartime Prohibition Law and the Volstead Act became effective in June 1919 and January 1920, respectively.

Data were procured from three principle sources: The Statistical Bureau of the New York Department of Mental Hygiene, the United States Bureau of the Census, and statistical schedules with related correspondence received directly from superintendents of State hospitals for mental disease.

Alcoholic mental disease is a term used to indicate several types of psychoses or mental diseases which are caused by excessive use of alcohol. A second group of patients in mental hospitals is described as "alcoholic without psychosis," indicating persons who, though not mentally diseased, behave in such a manner, as the result of excessive alcoholism, that their confinement and treatment in a mental hospital is necessary.

The intemperate use of alcohol is found to be an important factor in other types of mental disease as well. In many of these cases alcohol as a contributing cause is well established. In others the excessive alcoholism is found to be a result of the mental disease from which the patient is suffering. Among the 71,676 new admissions to all mental hospitals in the United States in 1922, 6,119, or 12.7 per cent, were intemperate users of alcohol. 29.4 per cent of all admissions due to drugs and other exogenous toxins, 14.0 per cent of those with psychopathic personality, and 16.3 per cent of those due to syphilis were intemperate users of alcohol, but only 6.0 per cent of the dementia praecox group, the largest of all, were intemperate.

Among alcoholic admissions to New York state mental hospitals the average period of excessive use of alcohol was found, by Pollock,[1] to be 22 years for men and 16 years for women.

Characteristics of Alcoholic Mental Patients

Pollock and Brown[2] found the following characteristics among alcoholic admissions to the state hospitals of 19 states during 1922, 1925 and 1926:

Sex. The ratio of males to females was approximately 6.5 to 1.

[1] Pollock, H. M., Decline of Alcohol and Drugs as Causes of Mental Disease, in Mental Hygiene, January, 1921.

Age. Alcoholic mental disease was found to be distinctly a disorder of advanced middle life, approximately 75 per cent of the alcoholic admissions entering the hospitals between the ages of 30 and 55.

Education. Approximately 8 per cent of alcoholic admissions were illiterate, 17.5 per cent could read and write but had not completed the fourth grade of common school, 6.0 per cent had a common school education, 6 per cent had completed high school, and 2 per cent had finished college.

Environment. 82 per cent came from an urban environment, i. e., from places of 2,500 population or over. Of the general population 56.2 per cent are urban.

Economic Condition. 65.6 per cent were reported as on the margin between self-support and dependency, while 29 per cent were dependent.

Changes in clinical characteristics of certain alcoholic mental patients since prohibition were noted by about half of the state mental hospital superintendents, the other half noting no change. Among the changes were:

1. Fewer cases of prolonged or chronic hallucinosis, with a corresponding increase in acute and violent hallucinatory states with violent mental outbreak and, upon recovery, profound amnesia regarding the hallucinatory state.
2. A small number of cases, not observed before prohibition, in which the alcoholic state is accompanied by a toxicity or poisoning often with destruction of nervous and organic tissue.
3. A larger percentage of young patients than formerly. One hospital reporting "during the past year an unusually large group of patients who are of high school age."

Alcoholic Mental Disease as an Institutional Problem

While important as a hospital problem, alcoholic mental disease comprised only about 3 per cent of the resident patient population, and a slightly higher percentage of new and readmissions in 1921. Data for 1928, however, show an increase to 4.7 per cent among new admissions and 3.8 per cent among readmissions. In 1928, also, 1.9 per cent of all admissions were "alcoholic without psychosis."

Trends Before and After Prohibition

The percentages of alcoholic admissions among all admissions to the state hospitals of 19 states, (Chart 1), for the years 1910, 1922, 1926 and 1928, show a decrease from 11.0 per cent in 1910 to 3.9 per cent in 1922, with an increase of 2.2 per cent from 1922 to 1926 and an additional increase of 0.8 per cent from 1926 to 1928. The total percentage in 1928 is still only slightly more than one-half that of 1910.

[2] Recent Statistics of Alcoholic Mental Disease by Pollock, H. M., and Brown, F. W., in Mental Hygiene, July 1929.

CHART 1.

Cases of Alcoholic Mental Disease among all admissions to the Hospitals for Mental Disease in 19 States during – 1910, 1922, 1926, 1928.

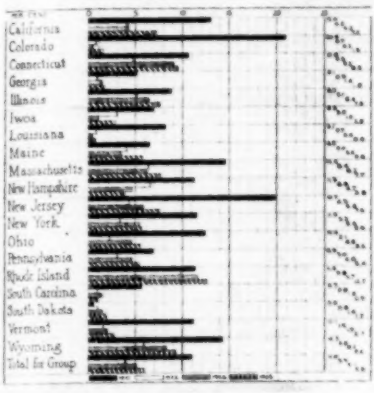


CHART 2

Cases of Alcoholic Mental Disease and Intemperate users of Alcohol among new admissions to New York Civil State Hospitals

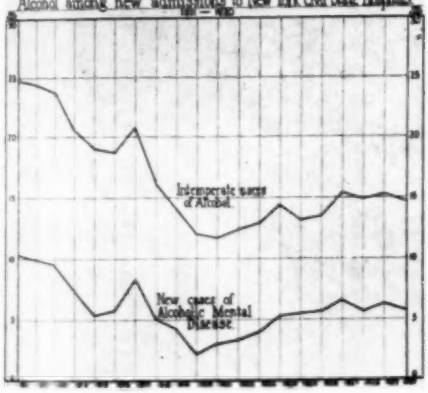


CHART 3.

All new admissions and new alcoholic admissions to 56 Hospitals in 25 States 1910 – 1930.

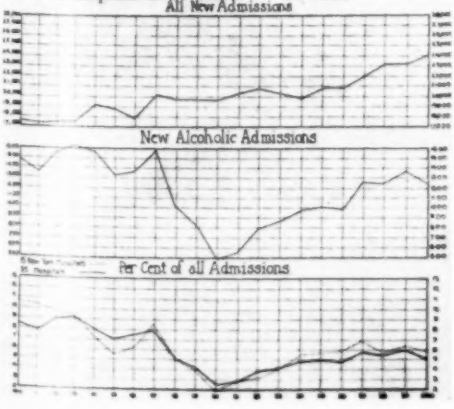


CHART 4.

Death Rates per 100000 of the General Population 1910-1929.

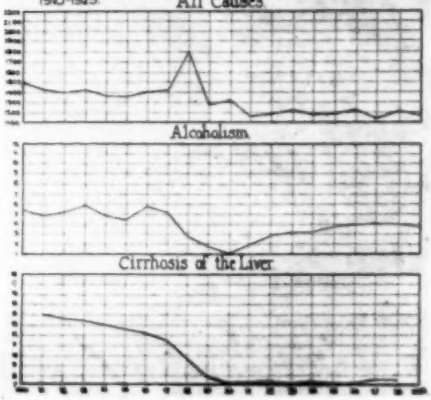


CHART 5.

New Alcoholic Admissions to 56 Hospitals 1910-1929.

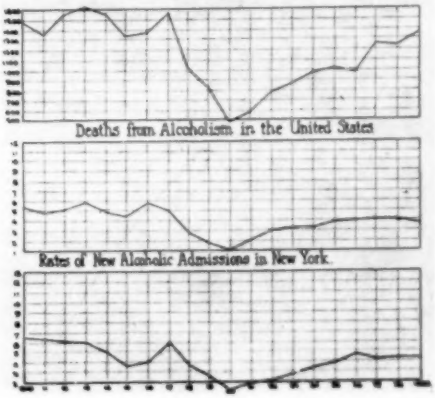
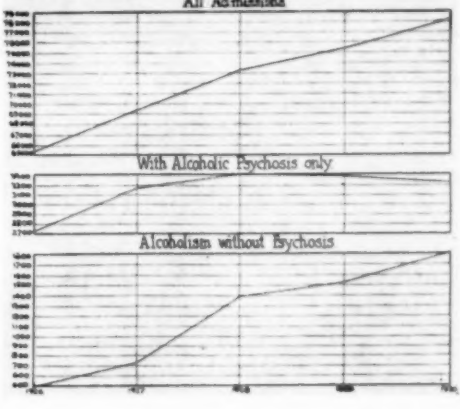


CHART 6.

Admissions to State Mental Hospitals 1926-1930.



Percentages of new cases of alcoholic mental disease and of intemperate users of alcohol among all new cases admitted to the civil state hospitals of New York over the 20-year period from 1911 to 1930, show a very definite decline from 1911 to 1915. (Chart 2). This decline, before prohibition, which will also be noted elsewhere, is believed due to the growing sentiment at that time against intemperance. There was a noticeable increase in 1917, with a steady drop to 1920. During these three years the prevailing public opinion favoring the conservation of food stuffs and the prevention of waste and excesses of all kinds was, it is believed, largely responsible for the success of prohibition enforcement. This may be called the real prohibition period. Following it, there is a steady increase in the percentage of alcoholics and of intemperate users of alcohol up to 1927, since when the trend has been irregular.

Similar trends are noted in the number and percentages of alcoholics among the new admissions to 56 hospitals in 25 states for the period 1910-1930, (Chart 3), and in deaths from alcoholism among the general population of the registration area of continental United States for the years 1910-1929. (Chart 4). Deaths from cirrhosis of the liver, caused by excessive alcoholism, show a similar decline to 1920, (Chart 4), but show very little increase since that time. These trends are very clearly indicated by a comparison of the new alcoholic admissions to 56 hospitals with the deaths from alcoholism in the United States and with the rates of new alcoholic cases, per 100,000 of the general population for New York, from 1910-1929, (Chart 5).

Most Recent Trends, 1926-1930

During the years 1926 to 1930 the total number of all admissions to all state mental hospitals increased from about 65,000 to 78,000, or 20 per cent, (Chart 6). Among these the alcoholics show an increase of 22.2 per cent, from 2,700 to 3,300 between 1926 and 1928 with a decrease of 3 per cent to 3,200 from 1928 to 1930. Most noticeable is the increase of 260 per cent among alcoholics without psychoses, from about 500 in 1926 to 1,800 in 1930.

Conclusions

The consideration of certain facts relating to alcoholic mental disease during the past twenty years leads one to conclude that,

1. "Prohibition" has not prohibited a notable increase since 1920 in the number of persons who misuse alcohol to such an extent that they become mentally diseased.
2. During the years immediately preceding the adoption of the 18th Amendment the intemperate use of alcohol decreased, bringing about a downward trend in the rates of alcoholic mental disease.
3. During 1919 and 1920 the sale and use of intoxicating liquor

was restricted to a degree that brought about a marked reduction in alcoholic mental disease.

4. Although the percentages of alcoholics and of intemperate users of alcohol among admissions to mental hospitals are at present below those of pre-prohibition days, their general trends have been upward since 1920.

Add to these conclusions the facts of the increasing number of alcoholics without psychosis and the increasing number of deaths from alcoholism in the general population, and the result is a conviction that there is ample justification for the selection of the year 1920 as the point at which the recent history of alcoholic mental disease and of other alcoholic excesses may be divided into the periods, before and after prohibition. That year marks the end of the decrease and the beginning of an increasing trend in alcoholic mental disease.

ECONOMIC LOSS TO NEW YORK STATE AND THE UNITED STATES ON ACCOUNT OF MENTAL DISEASE, 1931

By Horatio M. Pollock

The economic burden due to mental disease has been called to the attention of the people of New York State during the past eight years by three campaigns on behalf of proposals for bond issues for the building of State institutions. The proposals, all of which were approved by the voters, provided, in 1923, for a bond issue for $50,000,000 for State hospitals and other institutions; in 1925, for a bond issue of $100,000,000 for State institutions and other improvements, to be made available at the rate of $10,000,000 a year; and in 1930, for a bond issue of $50,000,000 for State hospitals and State prisons. About $90,000,000 of the proceeds of these bond issues has been or will be devoted to the construction of hospitals for patients with mental disease. Another phase of the burden was emphasized by the appropriation of nearly $24,000,000 in 1931, for the maintenance of patients with mental disease in the hospitals of the New York State Department of Mental Hygiene.

New light on the economic loss due to mental disease was made available in 1930 by the publication of an important book on the "Money Value of Man", by Drs. Dublin and Lotka of the Metropolitan Life Insurance Company. Previous to the publication of this study there was no authoritative work to which one could turn for information concerning the economic value of persons with varying earning capacity at different age periods.

The present review of economic loss on account of mental disease supplements two previous papers by the author; the one dealing with the economic loss to the State of New York on account of insanity in 1911, the other with the economic loss on account of hospital cases of mental disease and associated physical disorders in New York State in 1928. So far as known, no similar studies have been made. In dealing with the topic before us we shall first attempt an analysis of the economic loss to New York State on account of mental disease in 1931 and shall then apply the results obtained in making estimates for the country as a whole. We have limited our study to hospital cases of mental disease. We recognize, however, that the loss due to mild cases of mental disease cared for outside of State hospitals and licensed institutions is quite large but as little is known concerning the number of such cases or the duration or severity of their illnesses any estimate of such loss would be merely an unsupported guess. We deem it better to heed psychiatric counsel and hold fast to reality so far as possible.

Physical disorders play a prominent part in the causation and prolongation of mental disorders. In several of the groups of psychoses the physical and psychic elements are so intertwined that they cannot be separated. In other groups physical factors play a less conspicuous part. No way has yet been devised of calculating or estimating the relative importance of the two factors. In this study no attempt is made to evaluate physical factors or other causes contributing to mental illnesses.

The economic loss due to hospital cases of mental disease consists of two principal items:

I. The cost of maintenance of patients in hospitals.

II. The loss of earnings due to the disability and premature death of the patients.

I. The Cost of Maintenance

The cost of maintenance of patients in hospitals comprises three factors:

(a) Cost of hospital care and treatment including medical and nursing services, food, clothing, care of buildings and grounds and all other items that are essential to the comfort and well-being of patients in a modern hospital.

(b) The investment charge, which includes interest on the outlay for the hospital plant and equipment, and an allowance for depreciation and obsolescence.

(c) The cost of general administration. In our own hospital system this comprises the expense of conducting the two administrative offices of the State Department of Mental Hygiene, the Psychiatric Institute, the Bureau of special examination, the inspection service, the central purchase of supplies, the services for this Department of the Governor, the Legislature, the courts, the Attorney General, the State Civil Service Commission, the State Department of Public Works, the State Comptroller, the State Department of Agriculture and the State Pension Commission.

(*a*) *Cost of Hospital Care and Treatment*

Taking up in order these several maintenance factors for the fiscal year ended June 30, 1931, we find that the per capita expenditures for hospital care and treatment in the civil State hospitals was $421.76 and in the two hospitals for the criminal insane, $541.80. The per capita cost for the year in the licensed institutions is not available, but is estimated at $2,000 per capita.

(*b*) *The Annual Investment Charge*

The annual investment charge consists of two parts:

1. The interest on the value of the hospital plant and equipment necessary to house and otherwise care for the patients.

2. The allowance that must be made for depreciation and obsolescence of buildings and equipment.

To compute the interest charge we have to determine, first, the value of the hospital property which forms the base, and, secondly, the rate per cent.

The valuation of the present State hospital plants cannot be easily determined. Several of the institutions occupy land within city limits that is worth many million dollars. Just how much no one can say. Likewise the value of the buildings now in use cannot be accurately estimated.

The difficulties of an adequate appraisement or valuation of the several hospital plants being so great, we deemed it better to consider the present per capita cost of the building and equipping of a new hospital. Even this cannot be definitely determined as no complete State hospital has been built and equipped in recent years. Judging, however, from the cost of the new units at Kings Park, Creedmoor, and Rockland State Hospitals, the present average outlay for plant and equipment per patient is approximately $4,000. We have therefore used this figure in computing per capita investment charges in both groups of State hospitals. The capital outlay of the licensed institutions per patient is estimated to be $6,000.

Interest rates vary considerably from time to time. The average rate on first mortgages and good bonds in recent years has been about 5 per cent. On account of exemptions from taxation, government, State and municipal bonds bear somewhat lower rates. On a purely economic basis it seems probable that 5 per cent is a fair average and we have used it in our computations.

The rate per cent to be charged for depreciation and obsolescence varies according to the type of building or other property under consideration. Land favorably situated does not depreciate. Certain types of equipment depreciate from 10 to 25 per cent a year. Building of fireproof construction depreciate but little from year to year but may become obsolescent in 30 to 50 years. Wooden buildings depreciate much more rapidly. In view of our inability to segregate the values of the land and the various types of buildings and equipment constituting the hospital plants, we have arbitrarily decided to reckon depreciation and obsolescence at 2 per cent per year. This is clearly too high for the land values and too low for the equipment values, but probably represents a fair average. Combining interest and depreciation the annual investment charge would be 7 per cent of the capital outlay, or $280 per year in the State hospitals and $420 per year in licensed institutions.

(*c*) *The Cost of General Administration*

The expenditures of the administrative offices of the Department during the fiscal year of 1931 were $352,219.73. As the combined

average daily patient population of the institutions in the Department was 54,007, the per capita expenditures amounted to $6.52. This figure does not include any State expenditures for pensions or the costs to other State departments of services rendered in connection with the commitment and care of mental patients. The exact amount of such expenditures cannot be determined, but in view of the fact that considerable work is required of the Legislature, the courts and several State departments as previously mentioned, it seems probable that the total per capita cost for administration is approximately $10, and we have used this amount in our computations.

The several maintenance costs reckoned in accordance with the methods above described are summarized in Table I. They amount in the aggregate to $44,913,504.

TABLE 1

EXPENDITURES FOR MAINTENANCE OF PATIENTS IN INSTITUTIONS FOR MENTAL DISEASE IN NEW YORK STATE, FISCAL YEAR ENDED JUNE 30, 1931

	Total	Civil State hospitals 48,464 patients	State hospitals for criminal insane, 1,909 patients	Licensed institutions 3,634 patients
Maintenance and operation	$28,742,714	$20,440,339	$1,034,375	$7,268,000
Investment charge	15,630,720	13,569,920	534,520	1,526,280
General administration	540,070	484,640	19,090	36,340
Total	$44,913,504	$34,494,899	$1,587,985	$8,830,620

II. Loss of Earnings Due to the Disability and Premature Death of Patients with Mental Disease

Mental disease causes complete or partial disability for long periods and materially shortens life. About one-half of the patients who enter mental hospitals finally die therein. The average period of hospital life to those who die in the hospitals is between six and seven years. The death rate among patients is several times as high as among the general population of the same age distribution. From 20 to 25 per cent of the first admissions recover and from 15 to 20 more are discharged as improved. From 5 to 10 per cent are discharged as unimproved or as without psychosis.

It is probable that the loss for the year due to reduced earning power can best be determined by considering only the new cases, or first admissions, entering the hospitals. The loss thus viewed would be the present worth of that portion of the future earnings that is cut off by mental disease. The problem thus considered resolves itself into two parts:

a. The determination of the present worth of the net future earnings of an average man and of an average woman at each age of life.

b. The finding of the proportion of the future earnings that are lost when the patient is admitted to a hospital for mental disease.

Fortunately, we have at hand the book previously mentioned on the "Money Value of a Man" written by Drs. Dublin and Lotka. In such study the authors calculated the present worth of the net future earnings at each age of men of varied earning capacities. The earnings for the several working years were carefully graduated and deductions were made for the cost of maintenance. The net economic values thus calculated of a man with maximum earning capacity of $2,000 are shown for various ages in Table 2. Such a wage-earner probably represents a fair average of the males who become patients in New York State hospitals. It will be noted that the value at birth is given at $7,000; at 10 years of age as $14,950; at 20, as $23,850; and at 26, $25,200, which is the maximum. At 50 the value becomes $13,800 and at 60, $6,700; at 72, it becomes a minus quantity.

TABLE 2

ECONOMIC VALUE OF A MAN WITH MAXIMUM EARNING CAPACITY OF $2,000

(As Calculated by Drs. Dublin and Lotka)

Age, years	Value	Age, years	Value
0	$ 7,000	40	$20,350
10	14,950	50	13,800
20	23,850	60	6,700
30	24,450	70	400

The economic value of an average woman was not calculated in this study but is assumed by the authors in an earlier study to be half that of a man. We have used such assumption in our computations.

What proportion of the value of a person is lost when he develops mental disease and enters a State or licensed hospital for treatment? Estimates might be made for all first admissions or for each clinical group separately. The latter method gives a better analysis of the loss and was used in our calculations.

After careful consideration of discharges, deaths and duration of hospital life in each group we arrived at certain percentages of loss. These are set forth in the third column of Tables 3 and 4.

It will be noted that the percentage of estimated loss of future earnings in general paralysis cases is 75. Prior to the introduction of treatment by malaria and tryparsamide the percentage of loss of earnings in this group was close to 100.

As a rule the organic cases are past middle life on admission and present a less hopeful picture than the functional cases. The percentage of loss in senile cases is placed at 95, in arteriosclerotic cases at 85, and in alcoholic cases at 50.

Although there are few recoveries in the dementia praecox group, a large proportion of the cases improve so that they are able to do some productive work. The loss in this group we have estimated at 75 per cent.

Some of the manic-depressive and psychoneurotic cases are restored to full earning power while others continue in the hospital until removed by death. On the whole these two groups are perhaps the most hopeful of all, and we have estimated their loss in earnings as only 40 per cent.

The loss in the group with mental deficiency is placed at 10 per cent, as this group has low earning ability previous to admission to a hospital for mental disease.

In preparing Tables 3 and 4 we first classified by years of age the first admissions to all the State hospitals and the committed first admissions to the licensed institutions of each sex and psychosis; we then multiplied the number of patients of each age by the estimated present value of the net future earnings of an average person of same sex and age. The amounts thus derived for each psychosis were added and the totals were entered in column 2 of the tables. This column represents the net economic value of average persons of the same age and sex as the first admissions of the several clinical groups, Table 3 showing the values for the males and Table 4 the values for the females.

The next step was to multiply the amounts in column 2 by the respective percentages of loss shown in column 3. The products in column 4 of Table 3 show the losses for the males in each group, and the corresponding column in Table 4 shows in like manner the losses for the females.

Tables 3 and 4 take no account of the 1,914 voluntary and physician's certificate cases admitted to licensed institutions, as the psychosis and age of these cases were not reported. The cases included 1,125 males and 789 females. Assuming that the average economic value of these patients was the same as that found for the cases of same sex shown in Tables 3 and 4; namely, $15,598 for males and $7,629 for females; also assuming that 40 per cent of such value was lost on account of mental disease, we find the total loss for the male cases of this group to be $7,019,100; for the female cases, $2,407,712 and for both sexes combined $9,426,812. Adding this amount to the totals shown in Tables 3 and 4 we find the present worth of the loss of net future earnings of all first admissions to be $84,425,269.

We have previously seen that the cost of maintenance of hospital

TABLE 3
ESTIMATED LOSS OF NET FUTURE EARNINGS OF MALE FIRST ADMISSIONS TO INSTITUTIONS FOR MENTAL DISEASES IN NEW YORK, FISCAL YEAR ENDED JUNE 30, 1931

Psychoses	First admissions	Estimated net economic value of average persons of same age	Per cent of estimated value lost on admission	Economic loss due to mental disease
Traumatic	90	$ 1,238,485	50	$ 619,243
Senile	340	392,745	95	373,108
With cerebral arteriosclerosis	800	3,197,650	85	2,718,003
General paralysis	744	12,667,380	75	9,500,535
With cerebral syphilis	80	1,311,630	60	786,978
With Huntington's chorea	4	38,550	100	38,550
With brain tumor	15	261,045	95	247,993
With other brain or nervous diseases	87	1,732,920	70	1,213,044
Alcoholic	530	8,518,905	50	4,259,453
Due to drugs and other exogenous toxins	17	262,710	50	131,355
With pellagra	1	19,155	70	13,409
With other somatic diseases	57	783,145	40	313,258
Manic-depressive	534	9,999,230	45	4,499,654
Involution melancholia	97	1,040,420	70	728,294
Dementia praecox	1,396	30,756,840	75	23,067,630
Paranoia or paranoic conditions	38	504,155	75	378,116
Epileptic psychoses	105	1,928,108	85	1,638,892
Psychoneuroses and neuroses	69	1,466,395	40	586,558
With psychopathic personality	152	3,191,920	50	1,595,960
With mental deficiency	152	3,092,670	10	309,267
Undiagnosed psychoses	75	1,343,650	60	806,190
Without psychosis	101	1,793,235	40	717,294
Total	5,484	$85,540,943		$54,542,784

cases of mental disease in New York State in 1931 was $44,913,504. Adding this amount to the present worth of the net loss of earnings of the new cases entering the hospitals we have a grand total of $129,338,773. This amount, if our assumptions are correct, represents the loss in 1931 due to hospital cases of mental disease in New York State.

Economic Loss Due to Mental Disease in the United States.

We have still to consider the economic loss on account of mental disease in the United States as a whole. Unfortunately, data are lacking for the complete determination of such loss and we are compelled to make estimates based on data derived from incomplete censuses and from the results already obtained for New York State.

TABLE 4
ESTIMATED LOSS OF NET FUTURE EARNINGS OF FEMALE FIRST ADMISSIONS TO INSTITUTIONS FOR MENTAL DISEASE IN NEW YORK, FISCAL YEAR ENDED JUNE 30, 1931

Psychoses	First admissions	Estimated net economic value of average persons of same age	Per cent of estimated value lost on admission	Economic loss due to mental disease
Traumatic	11	$ 60,830	50	$ 30,415
Senile	450	291,970	95	277,372
With cerebral arteriosclerosis	602	1,405,535	85	1,194,705
General paralysis	215	1,918,408	75	1,438,806
With cerebral syphilis	26	178,775	60	107,265
With Huntington's chorea	9	72,460	100	72,460
With brain tumor	2	18,113	95	17,207
With other brain or nervous diseases	46	427,525	70	299,268
Alcoholic	105	875,998	50	437,999
Due to drugs and other exogenous toxins	11	91,233	50	45,617
With pellagra	....	.....	70	.....
With other somatic diseases	126	1,106,508	40	442,603
Manic-depressive	757	7,526,558	45	3,386,951
Involution melancholia	189	1,226,445	70	858,512
Dementia praecox	1,175	11,862,890	75	8,897,168
Paranoia or paranoic conditions	54	370,403	75	277,802
Epileptic psychoses	79	808,970	85	687,625
Psychoneuroses and neuroses	133	1,321,570	40	528,628
With psychopatic personality	120	1,209,993	50	604,997
With mental deficiency	105	1,082,723	10	108,272
Undiagnosed psychoses	84	836,610	60	501,966
Without psychosis	65	600,088	40	240,035
Totals	4,364	$33,293,605		$20,455,673

On January 1, 1923, the date of the last complete Federal Census of the insane in institutions in the United States there were enumerated 267,617 resident patients in public and private hospitals for mental disease. The number in State hospitals alone was 229,837 and in other institutions 37,780. Beginning with 1926, the Federal Census Bureau has collected annual data concerning patients in State hospitals only. The last published report of the Census Bureau relating to such patients is for the year 1928. The resident patient population in State hospitals on December 31, 1928, numbered 272,527, an increase of 42,690 since January 1, 1923. At the same rate of increase the resident patients in State hospitals on January 1, 1931, would have been 286,757. Assuming that the patient population of other institutions

for mental disease had increased at the same rate, their population on January 1, 1931, would have been 46,560. This number added to that representing the patients in the State hospitals makes a total of 333,317, which, we believe, is a fair estimate of the number of patients with mental disease in institutions in the United States on January 1, 1931.

Using the same method in estimating the first admissions to hospitals for mental disease in the United States for the year ended June 30, 1931, we find the number to be 91,899. On the basis of the sex distribution found in 1922, the male first admissions would number 53,353 and the female, 38,546.

For New York State we found the general average annual per capita cost of maintenance of patients, including hospital care and treatment, housing and general administration to be $831.62. In view of the fact that Federal data concerning costs of hospital care and treatment in the United States show that the general average annual per capita cost in all State hospitals is about three-fourths of the cost in New York State hospitals, we have decided to estimate the total annual per capita cost in the United States as three-fourths of that in New York State, or $623.72. On this basis the cost of maintenance of the 333,317 patients in institutions for mental disease in the United States during the year ended June 30, 1931, would be $207,896,479.

Likewise we estimate the loss of future net earnings of the average first admission to hospitals for mental disease in the United States to be three-fourths of the amount found for the average first admission in New York State. We believe such estimate is justifiable, as it is well known that the cost of living and salary and wage scales in New York State are considerably higher than those prevailing in most other states. Referring to Tables 3 and 4 we find that the average loss of earnings per first admission in such State to be $9,945.80 for the males and $4,687.37 for the females. Three-fourths of these amounts would be $7,459.35, and $3,515.53 respectively. On this basis the loss of earnings for the 53,546 male first admissions would be $399,418,-355 and for the 38,353 female first admissions, $134,831,122. These amounts added to the cost of maintenance as given above make a grand total of $742,145,956. This amount, we believe, constitutes a fair estimate of the economic loss due to hospital cases of mental disease in the United States in the year ended June 30, 1931.

Round Table Discussion on

"SOME APPLICATIONS OF STATISTICAL TECHNIQUE TO THE PROBLEMS OF ADVERTISING"

An Address by ALFRED T. FALK

In some ways, this is a unique session. In the ninety-two annual meetings preceding this one, there has never, to my knowledge, been a session on advertising. Nor do I know of any other learned society which has ever given official attention to this subject. Advertising has evidently been too trivial a matter, or perhaps too vulgar, for it has not been considered a suitable subject for profound thinking.

But for today at least, the American Statistical Association has approved advertising as a fit topic for discussion, thus placing it on a basis of equality with the depression, criminal statistics, and mental disorders.

As a matter of fact, advertising compels attention because it costs a huge amount of money and because it has a tremendous influence on our economic and social life. From its former position as a minor merchandising accessory, advertising has grown to the stature of a major factor in the distribution of commodities.

While growing so rapidly, advertising has largely been in the hands of men who are by nature imaginative, artistic, and sometimes perhaps impulsive. It seems that these qualities are closely related to the temperament that goes with the production of successful advertising. A cold blooded statistician is not naturally adapted to writing alluring advertisements.

And unfortunately, the inspirational advertising man usually is not naturally adapted to analytical thinking and to a scientific approach in the solution of his problems. That is why mathematics and advertising are still so far apart.

During the past few years, we have heard a good deal about the use of scientific methods in the practice of advertising. The fact is that, generally speaking, we are a little in advance of actuality when we refer to scientific application of advertising. Taken as a whole, the spending of our two billion dollar annual total advertising appropriation is still more or less a haphazard art.

We do have some good market research, a little measurement of advertising results here and there, but broadly speaking we still place our faith in generalities. A start in the right direction has been made, however. Our session this afternoon is a step in the process of educating both the scientific minds and the inspirational minds to the realization that advertising presents a suitable field of usefulness for

the factual analytical methodology which has been so helpful in its applications to other phases of economics.

A few of the pioneers in developing the scientific attitude in the study of advertising problems will read papers here today. Five men will speak from the respective standpoints of the research organization, the advertiser, the advertising agency, the publisher, and the marketing consultant. They will present a few types of problems in which statistical technique is a necessary part of the background for sound solution.

FACTORS IN THE RELIABILITY OF SAMPLES

By DANIEL STARCH

Instead of discussing the subject specifically assigned to me on the program—namely "Some Applications of Statistical Technique to the Problems of Advertising from the Standpoint of the Research Organization"—I shall discuss some specific phases of statistical technique as related to advertising and marketing problems.

My reason for selecting a specific aspect of the problem is that research procedure if it is thoroughly sound is fundamentally the same whether considered from the point of view of the research organization, the advertiser, the agency or the publisher. The specific aspect, therefore, which I wish to discuss briefly is designed to illustrate the importance of fundamentally sound scientific methods in dealing with advertising and marketing problems.

Since so much of research in this field must use some form of sampling method, I want to discuss some factors in the reliability of samples as my subject. The cost of securing complete data for all items in an investigation dealing with, for example, consumers, families, subscribers and the like would be prohibitive. Furthermore, from a practical point of view such complete information is not necessary. If a sample is properly secured, is of sufficient size and is properly handled statistically, the results are almost without exception satisfactory and adequate for practical use. In fact, in most cases a satisfactory sample is surprisingly small if proper regard is given to the scientific requirements in securing and handling the sample.

I wish to discuss the subject under three headings:

1. Procuring the sample
2. Size of the sample
3. Statistical treatment of the sample

1. PROCURING THE SAMPLE

The first requirement of procuring a proper sample is that it must contain representatives of the various families, persons or items as nearly as possible in the same proportion geographically, economically, socially or otherwise, in which they exist in the total group. If that is not the case, then the manner and the direction in which the sample deviates from such a true cross-section should be determined as fully as possible and appropriate corrections made for it.

To illustrate the manner of securing the sample so as to have proper representation of all types or variations in the total number concerned, I shall turn to some of the studies which we have made in recent years.

(a) *Layout of Survey*

Our Detroit newspaper reader survey will serve as an example of our method of dealing with this problem of securing a satisfactory cross-section through the distribution and obtaining of interviews.

Here is a chart showing the breakdown of the Detroit city area into the 132 subdivisions which we used in our allocation and scattering of interviews. These districts were originally laid out by the city planning commission. At the time of the survey, 1929, reasonably accurate population figures were available. The number of interviews made in each district was determined by its resident population. By thus establishing quotas according to the density of population in each of these districts, we were taking one of the first steps towards the securing of an adequate sample of the various types and classes of people in proportion as they actually existed in the total population.

In order to obtain the best possible cross-section for each individual district, the interviewers were instructed to scatter the interviews at definite intervals according to families, such as an interview every fiftieth family. This tended to prevent a concentration of interviews at street intersections and in certain types of neighborhoods. This factor of definite scatter made possible the securing of a more balanced sample of all types and classes of people.

It is possible that, despite these precautions, the results for any one district taken separately might be an understatement or an overstatement rather than a true cross-section. However, the important point to be noted in this connection is that it was our purpose to present results only for the *city as a whole* rather than for individual districts. Therefore, when the districts were combined, compensating errors tended to even out any deviation from the correct picture. If we had wanted to publish results for each district separately, it would have been necessary to materially increase our quota of interviews for each district.

(b) *Information Desired*

In trying to secure information which will uncover the desired facts, it is necessary to so phrase the questions asked that the answers will pertain to some definite *time* or *condition*. Again our newspaper surveys may be used as illustrations of the need of taking these points into account. Here the evaluation of the economic quality of families reached or the ascertaining of correct amounts of overlapping necessitate relating the answers to some definite time. It is necessary to avoid as far as possible answers being given for *every* newspaper that may at some time or other have found its way into the home or into the hands of some member of the family. By asking the question "what newspapers were received in your home or bought outside by some member of your family *yesterday*" a basis of uniformity is estab-

lished by this effort to confine the answers to a given day. If this principle is adhered to and a satisfactory cross-section of the population is obtained the projected circulation is more likely to agree closely with the actual circulation for the area covered than if this time element had been ignored. There is a tendency for people to mention every newspaper that comes to their mind irrespective of whether it is received or bought regularly, occasionally or otherwise.

Another point to consider is whether the questions are designed to yield *all* the necessary information. An example of this point would be the analysis of only that portion of a newspaper's circulation which actually reaches the home. Not only must it be ascertained what paper comes into the home by any one of the various methods but also what is bought and read outside by some members of the family and abandoned without ever having reached the home.

Wherever possible the questions should be self-explanatory in as great a degree as possible, or accompanied by appropriate personal explanation of what is wanted so that the person interviewed will understand what information is really being sought.

The person interviewed is frequently confused and this must be guarded against if the facts are to be ascertained. Correct answers, of course, are the objective but it is possible for incorrect statements to be made unless confidence is inspired by the interviewer and a satisfactory explanation given so as to promote accurate answers.

There is a natural tendency for people to give evasive answers to questions, and in some cases a deliberate misstatement of facts, unless they have a sympathetic understanding of the purpose of the interview. Brevity is desirable in both questions and interview, if accuracy is to be obtained. Careless answers and decided antagonism generally result when the person tires of the interview.

Sometimes use can be made of indirect questions in throwing light on certain factors where a direct question might encounter a very strong disposition to refuse. However, in questions that are decidedly personal, it is not so much *what is asked* as how the question is put and the atmosphere of cooperation, friendliness, and understanding which the interviewer is able to build up. Some provision must also be made in taking care of irregular conditions surrounding certain types of questions and their answers. For instance, in the matter of ascertaining occupations of the head or other members of the family the problem of unemployment or other disturbing elements arises. A person may be temporarily employed in the type of work which is not his regular occupation, or he may be entirely unemployed. In either case it is desirable that the usual or regular occupation in a period of normal times be ascertained.

Another point to consider is that questions should not be asked of people who cannot reasonably be expected to give a satisfactory an-

swer. This is an element which is often neglected in research work and, unless the person is fully qualified to answer the question, he should not be interviewed at all. Visitors, children, servants, boarders and lodgers are generally unsatisfactory for giving certain information about the family. Information given by friends, acquaintances and neighbors is also likely to be unreliable in many instances.

(c) *Supervision and Control*

In order to assure reliable and uniform results in the field work it is necessary that the interviewers possess a sufficient amount of education, native ability, resourcefulness and a type of personality to enable their adapting themselves readily to the temperament and training of the person being interviewed. Extensive training and instruction must be given to the interviewer. Close control and constant supervision must be exercised by those responsible for the survey. No matter how closely the interviewers are supervised a great deal must still be trusted to their individual judgment. Initiative and resourcefulness on the part of the interviewers are quite essential in order to cope with the whims and varied reactions of the informant. And it is generally true that the more personal the questions become the greater the resistance encountered. Consequently a vital requirement for securing a satisfactory sample is this factor of handling people correctly during the course of the interview. This also minimizes the number of refusals.

In order to test the quality of work done by the interviewer and to keep him mentally alert it is necessary to make a certain number of recalls. These recalls, where the person is interviewed a second time, afford an opportunity of making an accurate appraisal of the work done by the field force. A personal check as well as a verbal reiteration of the original information is possible. Reliability, care and knowledge of what is required are thoroughly tested. In case the interviewer is inclined to become careless these rechecks tend to correct a situation which, if allowed to continue, would invalidate the final results. It sometimes happens that the person interviewed fails to understand what is wanted and as a result of this faulty interviewing, inaccuracies creep into the replies.

Detailed instructions, both written and oral, must be given the interviewer for his guidance. However, new situations constantly arise that cannot be anticipated beforehand. Some of these the interviewer will have to handle upon his own initiative. Provision, however, can be made upon the interview sheet for the inclusion of such information with an actual statement of facts concerning such new situations or conditions that happen to arise. Salary compensation must be sufficient to satisfy the type of person required for this work. Emphasis must be placed upon *quality* of the work done rather than upon *quantity* of in-

terviews turned in. Therefore, a straight salary generally assures the most satisfactory work. The number of hours that a person can do interviewing effectually is also limited and if this is not considered a certain amount of inferior work is to be expected after fatigue sets in.

(d) *Methods of Obtaining Information*

When it has been decided what information is needed the question then arises as to what *method* shall be used to uncover the facts. Some of the more common methods are personal interviewing, mail questionnaires, telephone calls, etc. All of these have a place in the field of marketing research, the main problem is to determine which method is best adapted to doing the job in the most satisfactory manner.

In A.A.A.A. media research work *personal interviewing* has been resorted to most extensively because the type of information desired has generally been procurable most satisfactorily by this method. It is expensive. Nevertheless, certain information cannot be obtained with any degree of reliability without resorting to its use. It enables the securing of samples representing all classes of population more nearly in their true proportion. Furthermore, a personal estimate and check as the interview progresses is possible. Accurate reporting of facts is assured while supplementary explanation and interpretation of the questions can be effectively made.

Mail questionnaires may be useful for certain purposes but responses are likely to vary by income levels as is indicated by the chart. (See Chart 1. This tends to indicate that a perfect cross-section of all income levels is not likely to be attained unless some correcting factor is worked out and applied to the results. The percentage of returns is sometimes quite small while those answering are likely to be influenced by certain interests. Frequently the reliability of those answer-

Chart I

RESULTS OF MAIL QUESTIONNAIRE

Survey A

No. of Post Cards Mailed	*% Returned*
1,000	6.3

Survey B

		No. of Post Cards Mailed	*% Returned*
Total		800	7.0
Class D	($0–$999)	200	2.6
Class C	($1,000–$1,999)	200	2.5
Class B	($2,000–$4,999)	200	14.1
Class A & AA	($5,000 and over)	200	9.0

ing is likely to be questionable. The chief things to bear in mind concerning information secured by mail questionnaires is whether or not the results are going to be affected by distorting factors and whether or not some means of correcting these distortions can be applied.

The telephone has also been used as a means of securing information for research purposes. However, its uses are decidedly limited and for many research projects telephone interviews are not satisfactory. Where results are likely to vary by income groups a true cross-section of the total population would not be attainable by resorting exclusively to the telephone for telephone coverage varies by income groups and in the lowest income levels it becomes almost a negligible quantity. This is especially true in the case of the larger cities, and also in times of sub-normal business activity. Results thus obtained by telephone would likely give an unbalanced picture and would tend to load the figures too heavily with higher income results. Another factor of considerable importance is the difficulty of securing reliable information by telephone conversations. A thorough understanding and appreciation of the questions asked is difficult and unreliable statements are hard to detect.

2. *Size of Sample Required*

Just how large must the sample be in order to afford sufficiently reliable and useful results? Surveys have been made where the sample has been as small as a few hundred interviews, while in other surveys close to a hundred thousand interviews have been made. Sometimes a definite percentage of all families is interviewed. The answer to this seems largely to be governed by this question, "What degree of accuracy is required?" Nothing short of a complete coverage of all families is likely to yield perfect results. The number necessary then is largely a matter for the exercise of practical judgment. In some instances 300 interviews may yield useful results while in others 5,000 or more interviews may be needed.

The following charts indicate the results for the rentals of reader families of specific newspapers when 5,000 families were divided into groups of 500 each. Stabilization of results enters here at 3,000 to 4,000. At 4,000 the fluctuations have largely disappeared. Of course, there are some slight changes as additional increments are added but it is worthwhile to notice that the fluctuations all take place within an extremely narrow range and for all practical purposes the results of 3,500 would be satisfactory. An interesting thing to observe here is that the curves tend to flatten out and continue in a direction parallel to the base. This reflects the influence of the satisfactory scatter of the interviews. If the last few thousands had been concentrated in certain types of neighborhoods, then some of the curves would have shown a steadily rising tendency while others would have steadily declined.

Here are the results of another group of 106,000 families divided into groups of various sizes showing how much variation there was according to size. These units were built up by random selection from among the 106,000. On the whole they show remarkably close agreement, even among the smaller groups.

The most extensive comparison of a sample with a total group, within my own experience, has been the determination of the number of families in the United States having a radio receiving set.

Early in 1928, the task of ascertaining how many homes in the United States had radio receiving sets was undertaken. No figures were avail-

Chart II

Size of Group	*D*	*C*	*B*	*BB*	*A*	*AA*
500	1.40	45.20	29.40	20.40	1.80	1.80
1,000	1.30	45.50	27.80	22.00	1.70	1.70
2,000	1.30	45.60	26.85	23.35	1.65	1.25
3,000	1.30	43.77	27.57	24.46	1.57	1.33
4,000	1.37	44.95	26.90	24.00	1.58	1.20
5,000	1.50	45.48	26.54	23.74	1.56	1.18
10,00	1.61	44.97	26.22	24.57	1.66	.97
Final Results (106,146)	1.85	46.26	26.14	23.05	1.69	1.01

Chart III
Negro Population
City A

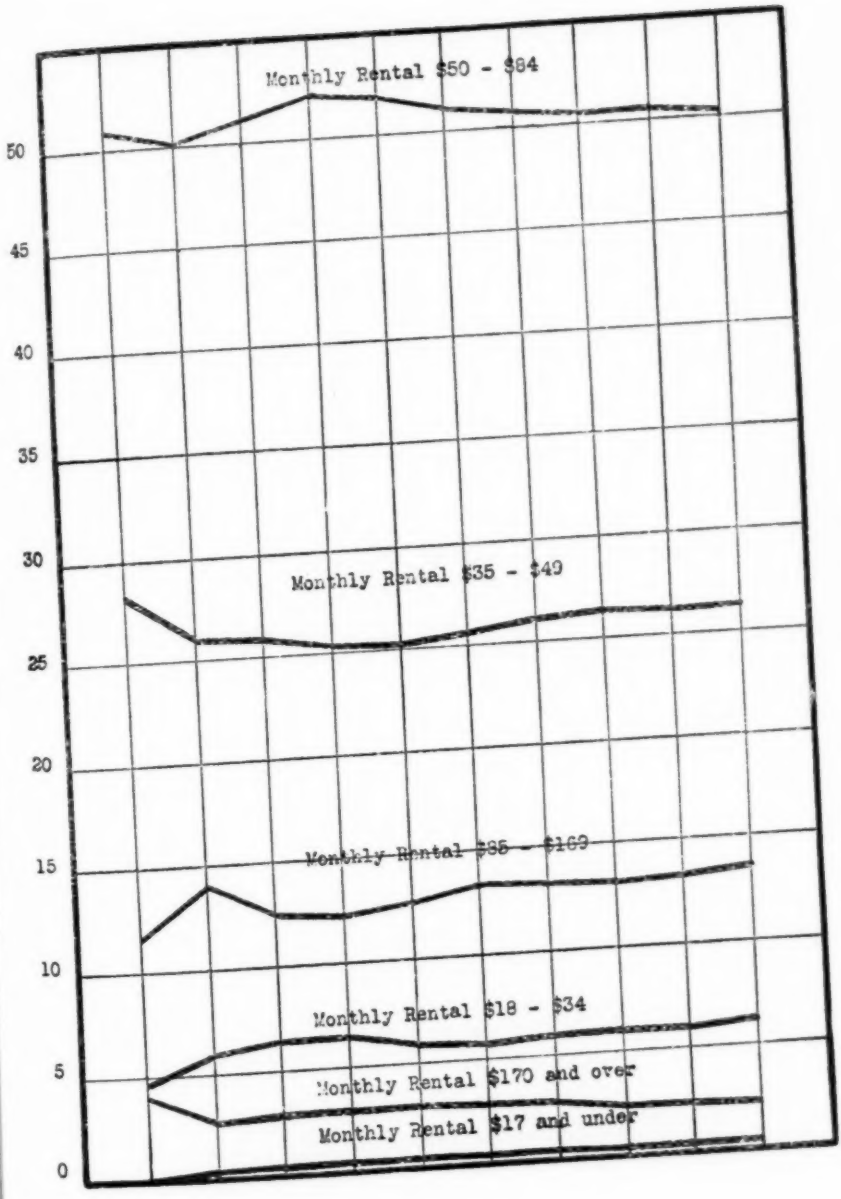
	Our Survey Families	*1930 Census Persons*
Per Cent White	88.22	88.40
Per Cent Negro	11.75	11.40
Per Cent All Others	.03	.20
	100.00	100.00

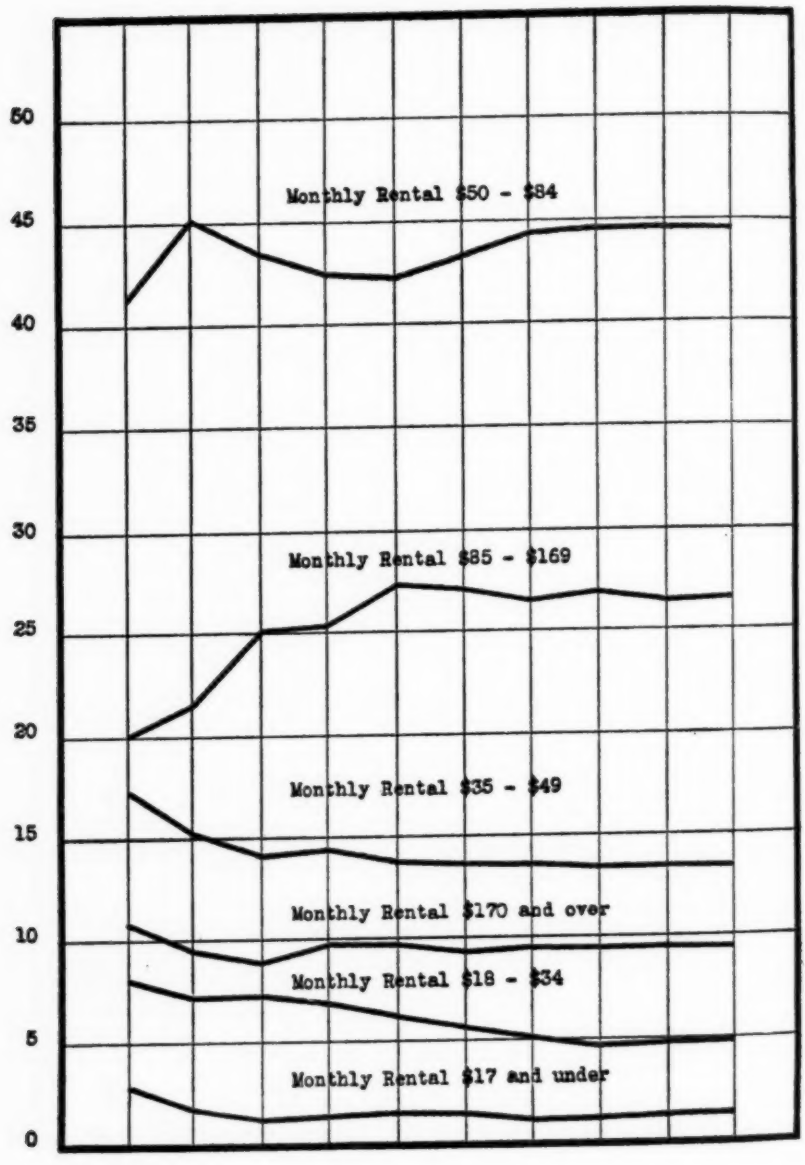
City B

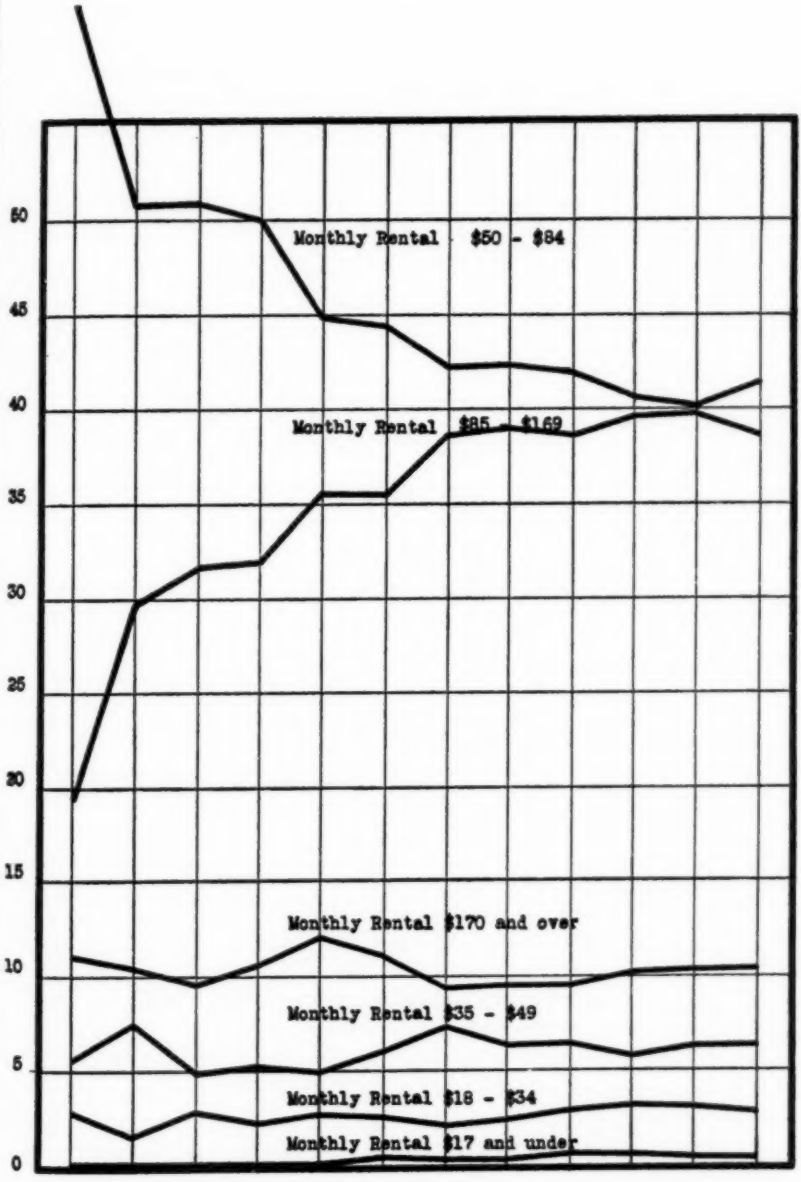
	Our Survey Families	*1930 Census Persons*
Per Cent White	97.77	97.29
Per Cent Negro	2.23	2.55
Per Cent All Others	0	.16
	100.00	100.00

Telephone Ownership

City A		*City B*	
% Families Having Telephones Our Survey	*% Families Having Telephones Complete Count*	*% Families Having Telephones Our Survey*	*% Families Having Telephones Complete Count*
54.10	52.00	48.73	48.12


Monthly Rental $50 - $84
Monthly Rental $35 - $49
Monthly Rental $18 - $34
Monthly Rental $170 and over
Monthly Rental $17 and under
50
45
40
35
30
25
20
15
10
5
0


50
45
40
35
30
25
20
15
10
5
0
Monthly Rental $50 - $84
Monthly Rental $85 - $169
Monthly Rental $35 - $49
Monthly Rental $170 and over
Monthly Rental $18 - $34
Monthly Rental $17 and under


50
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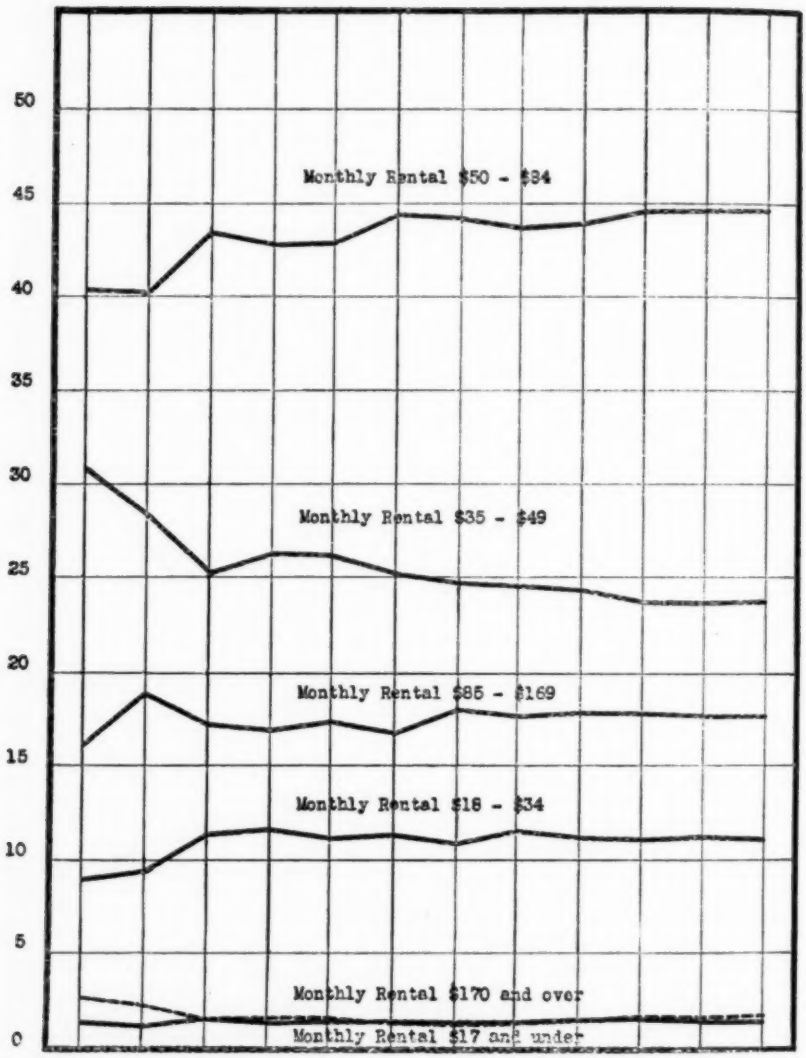
5
0
Monthly Rental $50 - $84
Monthly Rental $85 - $169
Monthly Rental $170 and over
Monthly Rental $35 - $49
Monthly Rental $18 - $34
Monthly Rental $17 and under



able. The Government had never made a count, figures by manufacturers were partial and incomplete, nobody knew how many sets were home-made and how many sets were being replaced by manufactured sets. An effort, therefore, was made to obtain as good a cross-section of the United States as possible by including in the sample data from all the various geographical sections, from cities and communities of all sizes, ranging from the largest to the smallest including farmers. This study was revised with some limited additional new field data in the fall of 1929.

The results were obtained from a field survey consisting of personal interviews with a total of 19,000 families. These results were then applied to the total families in the United States as of the early part of 1930. According to this survey, the projected number of families in the United States having receiving sets was 12,824,000.

As you know, the census of 1930 included a question on radio ownership. The census results have recently been made available and give the figure as 12,078,345. The difference is, therefore, 5.8% between the sample based upon 19,000 families and the total count in the United States.

(Parenthetically, the question has been raised whether the census figures may be somewhat of an understatement due to the fact that during the early part of the census taking this question was not covered by some of the census takers.)

This study of radio ownership is one of the rare instances in which it was possible to compare a sample with the results for the entire population. The close agreement indicates, it seems to me, that when reasonable regard is taken for the various conditions surrounding the securing of the sample and the handling of the results, a sample will yield very satisfactory results and will check reasonably closely with total results.

3. *Statistical Handling of Results*

A final factor of importance in all research work is the statistical handling of the information obtained. Raw data, even when obtained in accordance with conditions already set forth, must be handled so as to give correct interpretation of the situation. This usually requires more than a blind mechanical application of mathematical or statistical computations. It requires a thoroughgoing analysis of the factors in the problem so that compilations may be made intelligently and the ultimate results reflect the true status of the situation.

If the results of the field work are not a true cross-section, they sometimes can be corrected. For instance, the results for our mail questionnaire previously shown indicate a method of approach in the introduction of a correcting factor. Steps might be taken towards ultimate correction by including in the questionnaire definite inquiries concerning factors which would indicate family income. Segregation of replies could be made showing results by income groups. These results could then be weighted in accordance with the distribution of families in the various income groups for the country as a whole.

The radio study offers another example of using a correcting factor. In this case, the number of farm families interviewed was not in the true proportion to the percentage of farm population. This condition could be corrected by weighting the replies representing farmers in accordance with the percentage of farmers in the total population.

USE OF CORRELATION IN THE MEASUREMENT OF SALES POTENTIALS

By L. D. H. Weld

Without attempting to give a complete catalogue of the uses and applications of statistics by an advertising agency, the following list gives some idea of the importance of statistics in modern advertising:

I. *Analysis of Sales Figures*

An advertising agency analyzes for the client the trend of sales from year to year and seasonal fluctuations. It has the sales broken down by sales districts or trading areas. It analyzes selling costs. It compares sales with those of competitors and with those of the industry as a whole.

II. *Consumer and Dealer Surveys*

This involves the framing of questionnaires, decision as to proper samples, and the training and sending out of interviewers. Tabulation, interpretation, and graphic presentation follow. The measurement of public tastes and attitudes is involved.

III. *Media Analysis*

Although much of this is done by publishers and by organizations like the American Association of Advertising Agencies, there is much left for the advertising agency to do. Circulations are broken down by trading areas and rates have to be analyzed. Figures on duplication of circulation, type of people who read different publications, and the extent to which people are influenced by different kinds of media and by different types of editorial matter have to be scrutinized and interpreted.

IV. *The Testing of Advertisements*

This involves statistical records and interpretation of sales tests, of coupon returns, and of opinion tests. There is great opportunity for development of statistical technique in this connection.

V. *Measurement of Sales Potentials*

This involves the setting up of buying power indexes in order to measure market potentials for different commodities.

As a sample of statistical technique employed by an advertising agency, which I think may be of interest to members of the American Statistical Association, I shall describe briefly the use of correlation in the measurement of sales potentials.

Briefly, the objects in measuring sales potentials are as follows:

A. To establish sales quotas.
B. To discover weak and strong spots in distribution.
C. To decide how much advertising to place in each part of the country.
D. To throw light on the choice of media. (The most important of which are magazines, newspapers, outdoor advertising, radio, and direct mail.)

Most of the work which has been done in measuring markets has been rather crude. Some of the principal weaknesses in present-day methods are as follows:

A. A general index of buying power, such as the circulation of certain magazines, or number of income tax returns, is often used to measure the market for individual commodities, whereas there are usually special factors, such as climate, number of foreign born, etc., which are controlling factors.
B. When it is realized that there are special factors that affect the sale of any given commodity, these are usually determined by guess-work.
C. When such factors are combined into a single index, the weights to be assigned each factor are usually chosen arbitrarily.
D. Actual figures and percentages of United States totals are often used instead of per capita figures which yield much more accurate results.

To overcome these weaknesses and difficulties, the principle of correlation has been brought into use. There are those who will say that correlation is too complicated a process to use in connection with business problems and to explain to practical business men. The writer has had but little difficulty in explaining the general principle of correlation to business men, and in getting them to accept it as a sound method of procedure. No attempt is made to explain the technique. Correlation is merely put forward as a method of measuring the degree of correspondence between two sets of data, and of combining factors so that each is given its proper weight. Guess-work is thereby largely eliminated.

The General Buying Power Index

Although no general buying power index can be used for measuring the market of each and every commodity, it is valuable for the following reasons:

A. It indicates the general standard of living in each part of the country.

B. It is generally one factor (often the most important) in measuring the market of any commodity.
C. It offers the means of roughly measuring the "quality" of circulation of individual magazines in different parts of the country.

A general buying power index was constructed through the use of the correlation method by starting out with per capita retail sales by counties in Pennsylvania (the only state for which such figures have been available prior to the Census of Distribution). Some twenty factors were compared with this basic series, and finally after computing partial correlations, the four following factors were selected:

Number of income tax returns
Number of domestic lighting customers
Bank deposits
Combined circulation of four leading magazines

These four factors were combined by multiple correlation, yielding a coefficient of .85+ with actual retail sales as reported by the State of Pennsylvania.

Although retail sales as reported by the Census of Distribution will furnish as good a general buying power index as may be desired for practical purposes, an index computed by the method described above may be set up for inter-censal years. Conditions have already changed since 1929, the year to which the Census figures apply.

Although the index described above was based on retail sales in Pennsylvania, it has been definitely established that it applies with a high degree of accuracy to the country as a whole. Estimates of total retail sales by states check so closely with the figures issued by the Census of Distribution that when drawn in chart form, the lines practically coincide.

Measuring Quality of Circulation

By comparing the general buying power index with the density of circulation of individual magazines, it is possible to determine how circulation compares with buying power. For the so-called general magazines, the curves showing circulation per thousand population and per capita buying power as represented by the index follow each other very closely. The coefficients of correlation for some magazines run nearly +.90. In the case of certain "quality" magazines, circulation is "extra dense" in high buying power states and "extra sparse" in low buying power states. Magazines with low subscription rates that circulate in small towns often show inverse correlation with buying power. This method of measuring quality of circulation is never used as the sole criterion in selecting magazines to be used on any specific account. It is merely one of several factors that are taken into consideration.

Measuring the Market for an Individual Commodity

As has been pointed out, no general buying power index furnishes an accurate measure of the market for each and every commodity. There are usually special factors that have to be discovered and then combined. For example, in the case of gasoline, it has been found that a remarkably close estimate of total consumption can be arrived at by combining the four following factors: number of automobiles, percentage of commercial vehicles, general buying power, and a factor representing winter temperature. In the case of a certain drug product, buying power and negro population furnish an admirable index. In the case of a certain hair tonic, buying power combined with measures of temperature and dryness of the climate furnishes an adequate index.

By using this method of determining sales potentials geographically, it has been possible to change materially advertising plans so as to apply the right amount of advertising in each part of the country, with the result that sales have been increased in those sections where the potential is the highest. Sales quotas which have been found of great value to the sales departments have also been set up by use of this method.

It is not claimed that the use of correlation yields 100 per cent accuracy. In fact, no such degree of accuracy is necessary. There are certain local conditions that cannot possibly be subjected to statistical measurement, and arbitrary adjustments have to be made in order to obtain reasonable and practicable sales quotas. It is submitted, however, that it is far better to use scientific methods as far as possible, and thereby narrow the field for arbitrary adjustments and guess-work.

PRACTICAL METHODS FOR THE MEASUREMENT OF ADVERTISING RESULTS[1]

By WILLIAM J. REILLY

It would be difficult to select a subject more controversial than the measurement of advertising effects. Some flatly say, "It can't be done." Others contend that it can be done and that it is possible to take the guesswork out of advertising. But while the two sides have been debating, a few have been quietly engaged in impartial study. And in the last ten years, some progress has been made by these few who have been experimenting with actual situations.

While it is true that some advertising methods lend themselves to measurement more fully than others, the author has not yet encountered any use of advertising that does not lend itself to measurement of *some* significant effects *provided* the job of measurement is approached by the experimental method.

Those who say "It can't be done" contend that the effects of advertising are so mixed up with the effects of all other kinds of sales efforts that it is impossible to isolate them. But throughout the development of all science, the favorite refuge of those who have not known how to do a thing has been, "It can't be done." In any field of learning it is only since men have evolved methods for measuring, summarizing, and recording their experiences that we have derived much benefit from these experiences. And one of the main reasons why we have benefited so little from the rich advertising experience that is behind us, is that few methods have been developed for measuring the results of this experience.

Few have deliberately attempted to set up experimental studies and thereby separate the advertising elements which so many dismiss as immeasurable. But some such experiments have been set up. And whenever they have been set up by one who has made intelligent use of governing principles, significant measurements have been obtained.

Although cases that permit the removal of all guesswork are very rare in advertising, yet the cases in which sufficient evidence of productiveness can be secured to serve as a dependable basis for judgments are numerous enough.

In this brief paper, however, it is possible only to indicate some of the practical methods which have been used in attempts to measure advertising results. These methods will be presented under three main headings:

1. The measurement of the effects of house-to-house advertising

[1] An address given at the 93rd annual meeting of the American Statistical Association, at Washington, D. C., Wednesday, December 30, 1931.

2. The measurement of the effects of special dealer advertising
3. The measurement of the effects of mass media advertising

Measuring the Effects of House-to-House Advertising

Selling vs. Sampling.—The manufacturer of a food product employed two house-to-house methods for advertising his product. The advertising manager thought that "house-to-house selling is the most effective way of advertising the product among non-users simply because the purpose of the advertising is to encourage consumers to try the product and you can't get people to give a product a fair trial unless they pay something for it." The sales manager, however, felt that "if you *give* a person a full-sized package of a product, they'll be sufficiently grateful to you to give it a fair trial."

Four cities were selected—two comparable cities in each of two sales territories. In each territory, City A was used for house-to-house sampling and comparable City B for house-to-house selling. In each territory, a composite of several remaining cities was used for purposes of control. In each case, the house-to-house crews were asked to save the addresses of those homes into which they had succeeded in placing a package of the product. Two months after the work was completed in each city, those who received a trial package of the product were interviewed in order to learn 1) whether they had been using the product before, or whether they were non-users before they got the trial package; 2) whether they liked or disliked the product; and 3) whether those who were non-users when the work was done had used the trial package and had bought a package of the product in the regular way at the grocery store.

One year later, the non-users who had bought were interviewed in order to learn whether or not they still used the product and about how much they used per month.

In following up these two methods in the field, *gratitude* was found to be the key word in expressing the attitude of housewives who had been given a trial package of the product from the advertising crew. The actual testimony of housewives indicated that many non-users gave the product a fair trial because they had accepted a full-sized trial package and, in the process of trial, they had become converted. House-to-house sampling reached non-users *intensively*.

On the other hand, house-to-house selling reached only those comparatively few non-users who were willing to buy the product at the time from the advertising crew.

The main results of these experimental measurements, together with a statement of various unit costs involved, are presented in Table I. We see by the Table that it costs the manufacturer 40 cents to deliver a trial package of his product to the housewife by the house-to-house sampling method in City A, Territory 1. Seventy-five per cent of all families

TABLE I

STATEMENT OF RESULTS AND COSTS

	Cost per Housewife Who Received a Trial Package	*% of the Total Housewives Receiving the Trial Package Who Were Non-Users*	*Cost Per Non-User Who Received a Trial Package*	*% of the Total Housewives Receiving the Trial Package Who Were Non-Users and Later Bought at the Grocer's*	*Cost Per Non-User Who Bought at Grocer's*	*% of Total Housewives Receiving the Trial Package Who Were Non-Users, Who Bought at the Grocer's, and Who Still Used the Product One Year Later*	*Cost per Non-User Who Bought at Grocer's and Who Still Used the Product One Year Later*
TERRITORY NO. 1							
House-to-House Sampling in City A	$.40	75.0	$ .53	22.0	$ 1.82	13.0	$ 3.08
House-to-House Selling in City B	.58	20.0	2.90	5.2	11.15	3.1	18.70
TERRITORY NO. 2							
House-to-House Sampling in City A	.38	84.0	.45	26.0	1.46	16.0	2.37
House-to-House Selling in City B	.62	18.0	3.44	5.0	12.40	2.9	21.40

to whom a trial package was given, were non-users. By dividing 75% into 40 cents, we get 53 cents as the cost per non-user, who received a trial package. Only 22% of all those families receiving the trial package were "non-users who later bought a package of the product in the regular way at the grocer's." Dividing 22% into 40 cents gives the "cost per non-user who bought at the grocer's"—$1.82.

One year later, when these non-users who bought were interviewed to find out how many of them still used the product, it was found that 13% of the total families receiving the trial package could now be classified as "non-users who later bought at the grocer's and who still used the product one year later." In other words, 13% of the total could be considered as new users secured, and dividing 13% into 40 cents, gives us a cost of $3.08 per new user secured by house-to-house sampling method in City A, Territory 1.

Similarly, the cost per new user secured was calculated for the other three cities included in our study shown in Table I.

The use of such cost comparison is, of course, not without its assumptions and limitations. But the limited time provided for this paper will not permit a full discussion of these points.

The information given in Table I is sufficient to show that the house-to-house sampling method was a much more economical one than house-to-house selling. But, before house-to-house sampling could be passed upon as profitable, some approximation of what a new user was worth had to be developed.

Calculating on the basis of 1) a net profit of 5 cents per package, 2) an average consumption of two packages a month for a new user, the promised profit per new user was about $1.20 a year.

In this case, three years was considered as a reasonable time to wait before the profit secured from a new user's business would pay for the cost of securing this new user. Net profit, then, on new business would be realized three years after the advertising work was done. The estimated worth of a new user, therefore, was set at $3.60.

With this estimated worth of $3.60 per new user, the sampling method for securing new users at a cost of $3.08 in City A, Territory 1, and at a cost of $2.37 in City A, Territory 2 (see Table I), promised to be profitable.

Obviously the fact that this house-to-house sampling method promised to be profitable in one or two territories did not prove that it would be in other territories. In the first place, when the per cent of regular users reached is high, the consequent costs of reaching non-users can so increase as to make the work unprofitable. In this particular study, for example, it was found unprofitable to use house-to-house sampling in those markets where the per cent of housewives who already used the product exceeded 38%.

In the second place, certain sections of the country were found in which the prices of competing products were so low and the price resistance to the product so high, that an adequate return on house-to-house sampling was practically impossible.

There are many such factors which affect the results and consequent costs of house-to-house advertising methods—far too numerous to be discussed here.

Measuring Special Dealer Advertising

Demonstrations vs. Specials.—The manufacturer of a grocery product employed two special dealer advertising methods. The first plan was to employ demonstrators who sold the product in retail stores. The second plan was to advertise in the newspapers special sales of the product through which retail grocers offered a premium with each purchase of the product.

Those who received a package of the product by either of these methods were interviewed two months after they had received the package to find out what percentage of those reached were non-users who later bought at the grocer's. One year later the non-users who bought were interviewed to learn if they still used the product. In other words, the same kind of follow-up was made on these methods as has already been described in the study of house-to-house methods.

Anyone interested in the measurement of the results of window display advertising, will find an interesting discussion of the subject by Max Freyd in the Harvard Business Review, Vol. IV, pp. 196-202.

Measuring the Effects of Mass Media

And now we come to the most difficult job of all—measuring the effects of the use of mass media. Here one is faced with essentially the same kind of job as in measuring the results of the use of methods just given. The main difference is this. When a manufacturer uses a mass medium, his audience is, of course, dispersed and difficult to locate.

Without discussing any of the earlier attempts to measure the effects of mass media advertising, let us take an example of an experimental study which illustrates a careful, planned procedure.

A national advertiser, having national distribution, and using magazines and newspapers in the cost ratio of two to one, desired to determine the effect on sales of his newspaper advertising.

Sales for the last ten years had been divided into three territories, namely, Pacific section, Central section, and Atlantic section. All newspaper advertising had been segregated according to these three divisions. The advertising appropriation had been allocated according to native white population. Per capita native white sales seemed to be about the same for each of the three sections. Therefore, in summary, we have the United States divided into three sales units, each unit having been treated with the same proportionate advertising influences.

In 1929, it was decided to discontinue all newspaper advertising in the Central states area for a period of three months, namely, April, May, and June; then for the subsequent three months, July, August, and September, to cut all newspaper advertising in the Atlantic section. Thus for one three-month period the lack of newspaper advertising would be felt in the Central section and for the next three-month period, the lack of newspaper advertising would be felt in the Atlantic section. All other marketing efforts were purposely kept normal for each of the three units.

Each unit was regarded as a separate entity and a trend of sales was fitted to each. By eliminating seasonal influences, monthly variations were determined for each division.

Using the Pacific Coast section as the control section, bench marks were obtained for determining what sales should have been in the Central section. When these bench marks were compared with actual sales, the results for the three-month campaign were that less profit was lost, as a result of decreased sales, than the saving effected by the cut in advertising. The same procedure was used in measuring the results of the lack of advertising in the Atlantic section.

To determine what the influence of additional newspaper advertising would be, the regular advertising appropriation was doubled during the months of January and February, 1930, in the states of Oklahoma and Missouri. All other states received the regular appropriation.

By using sales in the non-test states as control states, bench marks were determined as to what sales would have been in Oklahoma and Missouri. The profits resulting from increased sales were less than the additional cost of advertising.

Conclusion

Brief as this discussion has been, it is meant to emphasize that any comprehensive study of advertising effects (regardless of advertising method used) should ultimately lead to the discovery of that point at which advertising costs begin to exceed the estimated worth of the results secured. It seems reasonable that manufacturers should go through some such experimental studies on costs and results before plunging into extensive advertising programs. But they rarely do. The cases which have been given are rare exceptions to the general rule. Ordinarily there is too much premature thinking about advertising appropriations. The thinking usually starts with some arbitrarily fixed amount of money to be spent on advertising. Certain media are thought of which can be bought in units so that the amount of space bought will cost the amount of money to be spent.

But not until those in advertising acquire the patience and the ability to analyze and to measure, can we possibly make the most of our advertising experience. Not until then, will advertising begin to assume a scientific complexion.

BUSINESS CYCLES: THE PROBLEM OF DIAGNOSIS

By J. M. CLARK

The business cycle may be conceived as a joint resultant of two groups of forces; first, originating or disturbing forces, and second, the responses of the business system to the first group of forces. The originating forces include such things as wars, the effect of weather and insect pests on crops, inventions and the development of new goods, non-seasonal changes of fashions or of consumers' wants, and any changes in the rate of development of economic processes such as consumers' demands for goods of various sorts, or the use of labor-saving machinery. Secular changes in price-levels would be included, and especially deflections or changes in the rate of change; together with the causes which bring them about. Even steadily progressive changes might be included, if the adjustments they make necessary are obstructed by the forces of economic inertia or friction until the pressure becomes too strong to be resisted, so that the ultimate adjustment is concentrated, sudden or even catastrophic in character. Such conditions may produce periodic disturbances of an apparent equilibrium which was only apparent, and under the surface of which tension had been accumulating.

In other words, the originating causes would include things whose causes are outside the economic system; and also things whose proximate causes at least are inside the economic system but are outside the course of the business cycle.

The term "originating forces" does not mean that these causes are necessarily of superior importance to the other group for the purposes of our study. Some of them may be things which are unavoidable, or even desirable in the sense that it would not be desirable to remove them; while the things we can change may be concerned with the responses of the business system. Even passive factors, such as the durability of certain types of goods, may be of the highest importance.

In accounting for the distinctive characteristics of the typical business cycle, it is almost certain in advance that the decisive factors will be those factors which are reasonably constant and are concerned with the responses of the business system, since the originating factors are too irregular to account for such regularities as the business cycle shows; or follow a different kind of timing. The system of business responses seems to spin its cycles in fairly uniform sequence, despite wide variations in the originating forces at work; while on the other hand it is hard to escape the conclusion that the same originating forces, acting on an economic system with a radically different system of responses, would produce a radically different result.

It seems probable, then, that the degree of uniformity found in the timing and characteristics of the business cycle is mainly the result of business' system of responses; while the variations in timing and behavior from one cycle to another arise largely from the random behavior of the originating causes, though they may also be partly due to changes in the conditions governing the responses of business. We must also not forget the possibility of certain types of response having different periods from others, so that changes in the timing and severity of cycles may be in part due to the fact that responses having different normal periods sometimes reinforce each other and sometimes neutralize each other. For example, some of the more mechanical features having to do with the construction of capital equipment and the using up of stocks of goods may have periods tending naturally to produce cycles of about 40 months, while the more extreme psychological brainstorms represented by our late "new era" delusion and the present reversal of it, and similar waves in the past, may have a natural period more like ten years, subject to interruption by such disturbances as wars. Large dislocations produced by a major war may also require more than the period of one 40-month cycle to exhaust their effect, even in the more mechanical fields.

In general, the "originating" causes may be provisionally assumed to have two effects: (1) in case the responses of the business system would ultimately, if left to themselves, diminish and fade out, they are prevented from doing so by renewed impulses of a disturbing character. (2) These impulses cause variations in the timing and severity of the resulting cycles.

Within this tentative theoretical framework we may attempt to fit the observed facts as to the business cycle.

Unwieldy as is the mass of statistical records of business cycles, it is still far from being full enough to answer all the significant questions that arise or to test all the theories. Figures of consumption and consumers' expenditures are but fragments; those of savings and investment are sadly incomplete and the full story of consumers' credit is not available. And hardly any of the series are sufficiently complete or accurate to give an adequate answer to any question involving small discrepancies in amplitude or timing between two or more of them. For instance, do consumers' expenditures shrink and expand more, or less, than personal incomes and do they lead or lag? This might serve to throw light on the question whether incomes shrink because expenditures have shrunk, or *vice versa*, if the data were full and accurate.

The means of diagnosis afforded by the statistical record consist mainly of the relative timing and the relative amplitude of the cyclical fluctuations of various related series; always in connection with a rational hypothesis serving to interpret the behavior observed.

Series which show unusually large amplitudes of fluctuation are

obviously proximate causes of disturbance; but the significant reason why they behave in this way is still to seek. In such cases the peak of activity is under suspicion of representing a rate which cannot be maintained in the nature of the case, without gross overproduction of the thing in question; with the result that it may merely amount to crowding four months' normal activity into three, with the result that less is accomplished in the end than if things had gone on at an even pace. This may be fairly evident after the event—the difficulty is to diagnose it at the time it is happening—to determine whether the country is dealing with a cyclical concentration of activity or merely a strong secular up trend.

In the typical business-cycle pattern there are three series or groups of series which stand out markedly: namely, construction and the related industries, production of producers' goods and volume of stock-exchange speculation. All have amplitudes far beyond the average; while two—construction and speculation—show large and unmistakable leads, though there is much variability in the timing, particularly as to the peaks of these series, which may occur in the early or the late part of the upswing of general business.

Construction is a form of production in which this peculiarity of behavior is easy to rationalize. If a man finds himself able to spend $50 a month more for rent than he has been spending, this creates a demand for added housing capacity the capital cost of which is something like $6,000. To satisfy this demand someone must spend immediately $6,000 before the consumer even begins to spend his added $50 a month. In fact, the result may be that someone spends $20,000, leaving some of the previous housing space idle. Thus there is an enormous discrepancy between the movement of the consumer's current expenditure and the volume of current production called for to satisfy his demand. And this is one of those cases in which the volume of current production is governed to a large extent by the rate of expansion of the ultimate demand and not solely by its total amount. This goes far to explain not only unusually large fluctuations but a tendency for the derived demand to lead the original demand from which it springs. The same principle applies, to a less extent, to durable consumers' goods which are habitually bought on the installment plan; and if our records were more complete they might have a very significant story to tell in this field. As it is, the indications available at least do not contradict the idea that these goods would show behavior somewhat like that of construction, though in less marked degree.

The volume of stock-exchange trading shows a pattern remarkably similar to that of construction; but the explanation must run in different terms. Time does not permit an attempt at a full explanation. The result is compounded of the intensified fluctuation of the demand for capital equipment, of the speculative demand arising from the increase

in prices itself, of interest rates and the supply of available funds. And a rising stock-market is a stimulus to general business, for reasons which do not need proving, though they would repay the most detailed examination. One unknown factor is the extent to which stock-market gains are spent for consumers' goods, and the extent to which losses produce the reverse effect directly.

Producers' goods in general afford a class of cases in which current demand depends largely on the rate of expansion of production for the ultimate consumer, with the resulting tendency to concentrated fluctuation and the crowding into the active period of a volume of production representing more than its quota of normal expansion, and more than can, in the nature of the case, be permanently maintained. The basic principle underlying this and residence construction is the same.

It is significant that producers' goods and construction, having the most intense fluctuations among the large groups, do not register changes of that degree of violence in consumers' desires or consumers' current expenditures; but intensified reflections of these changes. It is significant that the transmitting mechanism of business can make large derived fluctuations out of small original ones, and especially that it can make a succession of expansions and shrinkages out of what may be originally only fluctuations in the rate of growth, such as are practically inseparable from any kind of human development. This justifies us in regarding these elements in the causal chain as of peculiar strategic importance.

The fluctuations of prices afford evidence which runs in harmony with these other facts, to the extent that it is wholesale prices that fluctuate most promptly and strongly. It may perhaps be worth noting that the strictly cyclical movement of prices is relatively moderate. Such large dislocations as the world has experienced in the last three years are among the "originating" forces of disturbance.

Are overproduction or underconsumption major causes of business cycles? The answer of statistics is singularly inconclusive. Literal overproduction in the sense of the piling up of unsold stocks is apparently not general nor typical, though it has appeared in certain quarters in the present cycle. To give an adequate answer to this question there is need for more complete and better classified figures for stocks of goods, distinguishing especially those cases in which an increase of stocks represents a *willingness to buy* from those in which it means an *inability to sell*. It seems fairly evident that the real overproduction is not of consumers' goods in general but of productive equipment and construction; and, at times, of certain basic materials.

As to consumption, it appears probable that *actual shrinkage* of consumption is mainly a result and not a primary cause, arising from the shrinkage of incomes when production declines and workers are laid off. But that does not dispose of the question. Does this condition

of slackened production arise in part at least because consumption *has not expanded proportionately with production* in the upswing of the cycle? Viewed from the other end, this means not too little spent for goods in the aggregate, but too much spent for producers' goods as compared to consumers' goods, during the upswing. If consumption did so expand, would there be less concentration of savings and expansion of capital equipment in the active period, and hence less of that type of production which is inherently incapable of being maintained? Or would there be still more of just this type of expansion, financed by the expansive power of our credit system if original savings did not suffice? I do not at present see how statistics can answer this question.

If there has been underconsumption in the sense indicated, what are the causes of it? Do they lie in an improper distribution of incomes, or more fundamentally in a wrong direction of productive expansion which assumes that people will go on buying more of the same goods, instead of using imagination to anticipate the changed directions which consumption will take as a result of increased purchasing power; including the possibility of taking part of it in the form of increased leisure?

As to the place of money, prices, banking and credit, that must be passed over with a word, but not because these factors are not basically important. There is no question whether this group of causes or the group concerned with physical production of producers' goods is the important cause; they act jointly and interact on each other and we shall not cure the disease without controlling them both.

These are but a few of the fields in which statistical material bearing on this problem has been gathered; but they appear to be highly important fields, from the standpoint of explaining the typical course of the cycle.

The present cycle raises the problem why the depression has in this case been so deep and so long-continued. Here also the statistics afford interesting suggestions; but frequently they raise questions which statistics alone cannot answer. Was the mild rise of 1927-29 in most production figures something which should have led to an equally mild reaction, or was its mildness rather evidence of accumulated weaknesses which were preparing the way for a major catastrophe? In the light of hindsight we can tentatively answer this question; but it is not too easy to say why, even now, nor to point out the symptoms by which future observers may know in time to profit by their knowledge.

Construction ceased to expand almost at the very start of the 1927-29 expansion, and was declining through practically the whole expansion-period of general business. On the other hand, stock-exchange speculation continued to expand much longer than usual, reaching its peak some months after the first signs of contraction in general busi-

ness. If one of these was an unfavorable circumstance, was the other favorable? At any rate, there can be no doubt of the effect of the world-wide collapse in prices, nor of the extreme inequality with which this struck different classes of goods, nor of the shrinkage of our export markets due to the shrinkage of our export of capital, the weakening of Europe's finances, and the growth of tariffs.

The whole post-war period needs to be carefully studied to see whether its trends—which have been plotted in an unpublished study of the National Bureau of Economic Research—show symptoms of constituting a ten-year cycle.

These brief remarks may be taken as exhibiting samples of the difficulties of statistical diagnosis of the business cycle; together with some of its possibilities. By itself, it cannot tell us all the causes. And there is need for more accurate and complete data than are yet available before statistics can tell us by any means all it is inherently capable of telling.

THE IMMEDIATE CAUSE OF THE BUSINESS CYCLE

(An Address) By Willford I. King

To give a generalized explanation of the business cycle has been the endeavor of scores of economists and statisticians. Many have believed the end attained, only to discover later that the explanation fitting so well the phenomena of some one particular oscillation in business activity proved entirely inadequate when applied to a cyclical movement occurring at another time. The failure of so many to reach the desired goal has led some of the ablest students of the subject to conclude that there is no single force or set of forces dominating cyclical movements in economic life, but that each individual cycle is a separate phenomenon depending upon a unique combination of forces. If these writers are correct, any attempt to explain *the* business cycle is obviously futile. We are, instead, faced with the problem of explaining an infinite variety of business cycles.

When years of exhaustive research by leading economists lead to such conclusions, it may be the height of folly to continue further the quest for a generalized explanation of the cycle. However, the existence of so many characteristics common to numerous cyclical movements at various times and places leads the present writer to believe that, in spite of the testimony to the contrary, and also in spite of the fact that some of the ultimate forces behind the business cycle are still admittedly obscure, it is not only possible but probable that there does exist a single set of forces which are, in the main, *immediately* responsible for practically all major cyclical movements. He has the temerity to hold further that it is now possible to catalogue some of these forces.

The particular theory of the business cycle which appears recently to have found most favor with the public is that of over-production. Its popularity is doubtless to be accounted for mainly by the publicity which has been given to the remarkable growth, after 1920, in average output per man-hour in many fields of industry. To the layman it has seemed natural enough to suppose that, by 1929, the market had been oversupplied with goods, and that this oversupply caused the ensuing crash.

As a matter of fact, in June, 1929, there appeared to be plenty of money available to buy the entire volume of goods then being turned out. Inequality in the distribution of income showed no tendency to limit buying power and clog the wheels of industry. Neither overproduction nor underconsumption was in evidence. The stocks of

finished goods in the possession of producers were not unduly large. New machinery had not thrown any considerable proportion of our would-be workers into idleness. Producers had apparently succeeded in guessing fairly well at what kinds and amounts of goods the buyers wanted. There was no considerable evidence of over-building, and over-capacity of plants did not seem to be a very serious problem. Rising costs had not cut profits down to any notable extent. Few seemed to be worrying about machinery being too efficient, working hours being too long, or demand for goods being saturated. Industry was, in fact, functioning with gratifying smoothness. Not till six months or more later, when the depression was already well advanced, did the hobgoblin, Overproduction, appear on the scene. To ascribe the depression to overproduction is, then, an excellent illustration of the common error of confusing cause and effect. The cart has been put before the horse.

That the whole idea of overproduction is based upon the fallacious view that the total demand for goods is a fixed quantity, must be apparent to any economist who considers the question carefully. Since human wants are instatiable and since the sale of one product makes available the funds necessary for the purchase of other products, it seems evident that a *general* saturation of the market for goods is impossible.

While this fact is usually recognized by economists, many hold that the real cause of the present depression has not been *general* overproduction but rather overproduction of a few basic things, like cotton, wheat, copper, coffee, rubber, silk, and sugar. Advocates of this theory contend that, while there is plenty of demand for these articles at a very low price, the market will not absorb the supply at prices high enough to cover costs of production, and that this fact has dislocated our entire economic system. To defend this theory it is necessary to close one's eyes to the fact that our oversupplies of wheat and cotton have been present for a number of years and that they did not prevent the development of the boom of 1928-1929. No oversupply of copper was apparent while business conditions continued active. Since we are buyers of coffee, sugar, silk, and rubber, the cheaper these are, the more we gain. However, Carl Snyder, the leading authority on production statistics has exposed so effectively the fallacies of the overproduction theory that, to go into the matter more fully at this time, seems superfluous.

A number of prominent academic and business economists tell us that this depression has been brought about by maladjustments in business and industry, and that we are now witnessing the necessary but painful process of eliminating superfluous plants and inefficient producers. This hypothesis is difficult to disprove statistically but it is equally difficult to demonstrate. It seems to overlook the fact that the weeding-out process goes on in time of prosperity as well as in time

of depression. Furthermore, when depression comes, both the efficient and the inefficient suffer. In 1929, most of the leading industrial concerns were in excellent financial condition, heavy reserves having been accumulated during the long period of prosperity which they had been experiencing. Since that date, these reserves have been largely wiped out and not a few strong companies have either failed or been brought to the verge of bankruptcy.

Apparently, the depression, instead of serving as a device for eliminating the weak and preserving the strong has brought weakness all along the line. Furthermore, if the change from prosperity to depression were caused by maladjustments in industry, by growing inefficiency in production, or by the introduction of new machinery, we would expect the process to be a gradual one. The truth is that the decline is often both sudden and drastic. For example, in June, 1929, our factories were very active. By December, their rate of production had declined more than 20 per cent. To ascribe this change to any slow moving evolutionary process seems illogical. One must instead look for a force which is capable of acting with great intensity.

The experience of 1929 seems to show that the force producing the decline in that year was not connected with supply factors. Our factories, our railways, our mines were all in excellent condition to turn out the types of goods demanded by their customers.

What then led to the crash?

The answer is: "Demand suddenly failed." Between June and December, 1929, according to figures taken from pages 28 to 67 of the United States *Survey of Current Business* for August, 1930, new orders for various classes of goods shrank by the following percentages: hosiery 19, knit underwear 23, finished cotton goods 17, fabricated structural steel 8, fabricated steel plate 49, steel boilers 39, steel shelving 23, steel castings 5, cast iron square boilers 3, radiators 10, steam pumps 22, steel sheets 24, malleable castings 34, stokers 33, machine tools 43, electric hoists 19, electric cranes 38, wood working machinery 39, lavatories 34, sinks 41, miscellaneous enameled ware 40, electric motors 9, miscellaneous electric goods 15, electric furnaces 52, oil burners 44, General Motors automobiles 80, book paper 3, sales books 20, box board 21, building contracts 48, Douglas fir lumber 32. The only increases noted in this list were cotton textiles 32 per cent, steel business furniture 1 per cent, cast iron round boilers 1 per cent, foundry equipment 17 per cent, and wire cloth 37 per cent. The fact may also be noted that the operating revenues of railways declined 12 per cent during the half year. Of course, some of the declines were seasonal but, normally, new orders in December to take care of spring business are probably about equal to new orders in June to accommodate the autumn trade. How then is this sudden and drastic shrinkage in demand to be explained?

The only plausible explanation seems to be that the forces responsible were psychological rather than physical. Ideas are contagious and, like some infectious disease, sweep over an entire nation with surprising rapidity and are then carried to foreign lands. In the United States in the early autumn of 1929, public opinion as to the outlook for the future suddenly changed. Faith in the "New Era" gave way, and, when it did, the "New Era" tumbled to destruction.

It was primarily this change from confidence to doubt— from optimism to pessimism—which caused such a radical decline in the volume of orders for goods. There was, however, present another causal factor besides unreasoning fear. This other causal factor was increasing lack of ability to continue buying at the rate prevailing during the early part of 1929.

This latter force will perhaps be better understood if attention is first focussed upon the relation between the national income and the buying capacity of the nation.

The aggregate income of the people of the nation is relatively stable. Thus, in the 20 years from 1909 to 1928, there were only 5 years in which this income, when measured in dollars having constant purchasing power, did not show an increase, the only decline of any consequence being that occurring between 1917 and 1921. This decline was apparently caused, first by our participation in the World War; second, by the reconstruction of our industries made necessary by the return of peace; and third, by the serious disturbance to our industry resulting from currency inflation both here and abroad. Under reasonably normal conditions, the aggregate of realized income departs surprisingly little from a smooth trend.

That the national income fluctuates less than the total volume of production is probably explained primarily by variability in the lag between production and resulting income. To illustrate this variability, we may consider the case of the income derived from a wheat farm. Let us suppose that the wheat is harvested in July and that the entire crop is sold by the farmer at once. This does not mean that the effect of the wheat crop on the national income terminates immediately. The insurance company which owns the mortgage on the farm may receive in January as interest part of the receipts from the wheat crop. This interest money may be distributed as a dividend to stockholders in March. The chain evidently continues indefinitely. Clearly, then, the movements of the national income are by no means synchronous with the movements of production, even though the income total is obviously dependent upon the volume of production. The income figures, therefore, resemble a moving average of the production figures.

We may assume the present, normal realized income of all the people of the nation to be $90,000,000,000. Were we existing in a "stationary state," there would be no growth of population and no saving,

hence the aggregate value of direct or consumption goods purchased annually would likewise be $90,000,000,000 yearly. Our actual economic life is, however, highly dynamic. We are unable to predict for the future the courses of prices, the demands for products in different industries, the demands for products of individual concern, or production costs. Because of this uncertainty concerning the future, and because of our desire to get ahead financially, most of us feel it necessary to save part of our respective incomes. All of us together save in the average year perhaps $10,000,000,000 out of the $90,000,000,000 aggregate of realized income and use the remaining $80,000,000,000 to purchase direct or consumption goods.

To say that we spend for consumption $80,000,000,000 per year *on the average* is very far from being the same thing as saying that we spend this amount in each year. The fact is that the actual amount spent varies greatly from year to year. An obvious reason for variation is that the national income is not constant. There is, however, another reason, which is perhaps even more marked in its effects, but which is frequently overlooked. This second reason is a change in national sentiment from optimism to pessimism, or vice versa. Optimism normally leads to free spending, pessimism to parsimony.

Whenever a wave of optimism sweeps the country, most individuals minimize the danger of future troubles and magnify future opportunities. The hope of securing easy profits leads business men to expand operations, and this means buying more materials for construction or more goods for stock. Individuals, feeling that their future incomes are reasonably secure, purchase new automobiles, radios, houses, clothing, and other durable goods of all descriptions. Before the period of optimism has long continued, a large proportion of business concerns and individuals find themselves spending more than their incomes. To do so, they must draw on accumulated savings. In many instances, these savings soon prove inadequate to cover their demands for goods, and, to make the desired purchases, it is necessary either to borrow money or to buy goods on credit. As the tendency to buy on credit spreads, the total volume of orders for goods soon comes to exceed the national income. In early 1929, for example, we may have been making purchases of goods and securities at a rate of $100,000,000,000 or even $110,000,000,000 per annum, although our total realized income was not much over $90,000,000,000 per year.

The contention may be advanced that, since for every dollar borrowed there must be a dollar lent, the whole line of reasoning here presented is fallacious. It must be admitted that if Brown, who has been planning to buy a $1,000 automobile, loans the $1,000 to Jones who spends it for furniture, the total demand for goods is not increased. This transaction is, however, not typical. The usual procedure is for Smith to order an automobile, paying a fraction of the value in cash and

mortgaging his future income for the balance. The note which he gives to the automobile dealer is discounted and eventually is converted into a bank loan. Now one of the peculiar functions of a bank is to create circulating credit. When a bank loans money, it does not thereby curtail the total national demand for commodities, for the bank was not in the market for commodities. What really happens is that the bank creates a supply of circulating credit, known as deposits subject to check. These deposits virtually constitute an additional supply of money. Between 1924 and 1929, the volume of such demand deposits in banks belonging to the Federal Reserve System increased by more than 1½ billions of dollars. More significant, however, is the fact that, during the same period, the velocity of circulation of the whole 12 to 14 billions of deposits increased nearly 70 per cent. The extent to which the banks of New York City, alone, enabled individuals and firms to buy beyond their incomes is also indicated by the 5 billion dollar expansion, occurring during the period just mentioned, in the volume of their loans to brokers.

As the volume of loan-financed purchases grows, and as the velocity of circulation of demand bank deposits increases, prices rise, and this upward movement intensifies the spirit of optimism already prevailing. More and more orders for goods and securities are placed by both individuals and corporations.

Obviously, when credit extension results in increased sales by retailers and wholesalers, factories are immediately called upon to furnish more goods. When the unfilled orders on the books of factories increase in volume, the factories call for more workers. Before the boom has continued long, the supply of well-qualified workers, willing to work at prevailing wage rates, has been absorbed. If the wave of optimism rises still higher, the unusual demand for goods leads employers to raise wage scales. These higher wage rates entice into the field of "money-making" a considerable number of persons not normally classed among the gainfully occupied. For example, married women, aged and infirm men, and boys and girls usually in school enter industry to take advantage of the abnormally high wage rates prevailing. They come, however, reluctantly and must be paid heavily in comparison to their efficiency. Wage costs per unit of output therefore rise.

During boom periods, producers find, in fact, that costs of all types tend to advance, for, in order to secure the supplies needed to keep production at peak, some of these supplies must be purchased from producers ranking well below the maximum of efficiency. Similarly, interest rates tend to rise, partly because, in order to supply the capital necessary to finance a boom, saving must be encouraged among a class of persons whose desires to spend are relatively strong.

These rising expenses of production have often erroneously been supposed to be responsible for the crash. As a matter of fact, how-

ever, they apparently have little to do with bringing about the collapse, for profits normally remain satisfactory as long as orders from buyers continue to pour in. In so far as responsibility for the business cycle is concerned, rising costs must, then, be regarded primarily as resultants rather than causal phenomena.

However, as costs of production rise, producers tend to mark up the prices of their products. The result, which has often been noted, is that, in the later stages of the boom, although the total value of industrial output grows steadily, there is but little expansion in the physical volume of the product.

What terminates the upward movement of the cycle? To this question no convincing categorical answer can, at present, be given. It may be argued that increases in the prices of finished goods eventually frighten the buyers and produce a "buyers' strike." There is probably some truth in this hypothesis, though doubtless rising prices tend almost as often to stimulate buying through the fear that prices will go still higher as they do frighten buyers because the prices seem too high. Rising prices of finished products probably tend to bring about a collapse of the boom mainly because income, being sluggish in its movements, does not rise as fast as the prices of goods. Therefore, the volume of goods which can be purchased with the income available to consumers shrinks, and orders tend to fall off. If consumers insist on purchasing the same volume of goods as previously, they can do so only by going into debt.

The probabilities are that, at the inception of any boom period, nearly every adult has at his command credit sufficient to enable him either to borrow money or to buy goods on time. This command of credit may be only a few cents or it may run into many millions of dollars. As long as a person has additional credit available, he is in a position to spend more than his income. Business concerns are, in this respect, in the same position as individuals.

Nothing can be clearer, however, than that, if expenditures continue to exceed income, the time must eventually arrive when all available credit will be exhausted. If we are correct in our assumption that booms are made possible solely by the fact that large numbers of people are spending more than their incomes, it follows that no boom can continue indefinitely for the simple reason that, one by one, the buyers will come to the end of their credit. If, during a boom, when the national income is $90,000,000,000, buyers are placing orders for $110,000,000,000 worth of goods annually, they are, as a group, going into debt $20,000,000,000 deeper each year. If half of them exhaust their credit, the remainder cannot spend at a $110,000,000,000 but perhaps only at a $100,000,000,000 rate. This, however, means a shrinkage in orders of $10,000,000,000. Such a shrinkage is probably large enough to wreck any boom.

One is not justified in assuming from the discussion in the preceding paragraph that the collapse of the boom is always, or even usually, due to credit exhaustion. This is merely the force that is sure to act if no other force intervenes at an earlier date to cause a lessening of that spirit of optimism which is essential to the continuance of the boom. Whenever, for any reason, logical or absurd, a spirit of doubt becomes widespread, the knell of the boom is sounded, for this spirit of doubt will lead many to stop buying on credit and some will actually begin saving. This means a reduction in the total value of goods ordered.

When the total money volume of orders for goods diminishes, it is evident that either prices must fall or factories must curtail production. Curtailment means laying off workers.

If either prices are cut or workers laid off, confidence in the future continuance of the boom will be severely shaken. Many persons will sell securities. Others will cancel orders for goods already given. More will stop buying articles not needed for immediate use.

This change in sentiment and buying policy acts like a snowball rolling down hill. As it gathers volume and accumulates momentum, panic results. Prices fall rapidly. Real estate and securities are sacrificed, not because the owners wish to sell, but because they are compelled to sell. The selling forces prices still lower and this new decline causes additional forced selling.

Not only do falling prices cause forced selling, they also lead to postponement of buying by those persons who believe that prices will go still lower and who are also in a position to wait. This postponement of buying likewise accentuates the price decline.

Declining prices make business unprofitable. They also lessen the value of collateral and make it difficult for business men to borrow. Though interest rates on loans accompanied by highly acceptable security fall very low, lenders are chary of lending on ordinary security, and credit is scarce for enterprises involving any considerable degree of risk. Finding it impossible to sell goods at prices sufficient to cover costs of production, entrepreneurs curtail operations and lay off workers. As workers cease to draw their customary wages, the national income is materially reduced. Soon dividends are passed, and this reduces the national income still further. Furthermore, the ratio of the value of commodity purchases to the national income declines, for now people in general are engaged in paying off debts or accumulating savings—in other words, they are, on the average, spending less than their respective incomes. As savings accumulate, few people wish to borrow and many wish to lend. The more general becomes the habit of saving rather than buying, the greater the number of the enterprises which must shut down and the more numerous the workers who must be discharged.

Why do we not then eventually arrive at the situation in which in-

dustry is at a standstill and everyone is starving? The answer seems to be that two safety valves prevent this dire outcome. First, no matter how pessimistic people become there always exists a list of goods to be bought which they consider so essential that they will buy them as long as they have the funds to pay for them. In the United States, therefore, even in times of extreme depression, sales of the more staple foods and articles of clothing decline relatively little. Second, in a fertile country like the United States it is possible for almost everyone to extract a living directly from the soil. When other sources of income fail, there is, therefore, a tendency to migrate to the farm and live on the products of the land. "Hard times" in this country are, then, never likely to become as hard as they may in countries which nature has less abundantly endowed.

According to the theory just expounded, changes in general optimism or pessimism cause people to order goods valued sometimes at much more and sometimes at much less than the national income, and it is these changes in the volume of goods demanded which are *immediately* responsible for the business cycle. If this theory is correct, it relegates to the discard many of the most widely held beliefs concerning the origin of the business cycle as, for example, the circuit flow of money theory, the maldistribution of income theory, the overproduction theory, the new machinery theory, the planless production theory, the maladjustment of production theory, the rising costs and shrinking profits theory, the excess of producers' goods theory, and a whole host of others less widely held.

The sweeping statement just made does not mean that numerous miscellaneous forces may not increase or diminish the intensity of the fluctuations. Thus it would be surprising indeed if, in some cases, a business depression was not made worse by crop failures, or by the aftermaths of war. The suggestion here made is that, while these auxiliary forces affect various cycle waves differently, the variable use of credit by purchasers of goods is a very important causal factor in the case of nearly every cycle wave.

The explanation here essayed is, however, avowedly incomplete. While it purports to cover all cycles, it leaves unsolved at least one of the most fundamental questions concerning every cycle. The fundamental problem still defying solution is why these ups and downs of sentiment and business activity occur at intervals which have a marked tendency toward uniformity, the typical wave length being some 39 or 40 months.[1] No explanation of the nature of the business cycle can pretend to be complete which fails to clear up this mystery. Jevons said we must look to sun spots for the clue. Similarly, Professor Henry L. Moore tells us that rainfall cycles are responsible. Perhaps the ex-

[1]For proof of this fact, see the article by the present writer in *The Annalist* of May 1, 1931. It is entitled *Has the Business Cycle a Definite Wave Length?*

planation does lie in natural forces. Perhaps, on the other hand, the real cause is some peculiarity of the human mind which forces it to move from optimism to pessimism, or vice versa, in a rather definite time interval.

Even though we do not understand all the forces underlying the cycle, this is far from saying that we can do nothing to control its movements.

We do not yet know the nature of electricity, yet we are successful in making electricity serve our needs. Perhaps, then, an understanding of nothing but the mechanics of the business cycle, will enable us to control it, even though we do not completely fathom its nature.

To those interested in the advancement of human welfare, the theory here set forth as to how the cycle operates is perhaps considerably less discouraging than many of the rival theories, for, apparently, it does not imply that, in order to mitigate the evil effects of depressions, we must rebuild the foundations of our economic system. It does not, for example, assume that we have too much equipment, that our industries are too productive, that our system of business enterprise is fundamentally wrong in nature, that we must either control all our activities through cartels or government commissions or else have all enterprises taken over by the state. It does not tell us that thrift is pernicious and competition ruinous. It does not even hold that depressions are economic housecleanings, essential if our national domicile is not to become unduly cluttered with obsolete equipment and enterprises.

Granted, however, that depressions are due mainly to over-optimism and over-use of credit, what, if anything, can be done to lessen their severity? Opinions will doubtless differ on this point, but certain facts in past experience seem to warrant the view that it may be possible to exercise a very considerable degree of control.

Advocates of direct action would probably say that, if buying on credit is to blame, buying on credit should be limited or forbidden. To do this would, however, mean placing serious limitations upon freedom of contract, a policy which would doubtless come into immediate conflict with the Constitution, and would, furthermore, be at odds with all our traditions. It appears, therefore, that practical considerations make it imperative to attack the problem indirectly.

Let us begin our consideration of the problem of regulating the cycle by analyzing the situation in 1929. Production was progressing satisfactorily but not feverishly. The financial condition of business was excellent. Commodity prices were but slightly inflated. Stock prices, however, were absurdly high, many issues selling at 25 to 40 times earnings. The velocity of circulation of bank deposits was far above normal. Most of our excess indebtedness and most of our monetary fever centered in the stock market. A radical decline in stock values was then inevitable, even though painful. Presumably,

also, a slight downward adjustment of commodity prices and wages was necessary in order to enable the normally expended fraction of the national income to cover production. The recession occurring up to the end of 1929 seems therefore to have been normal and did not call for remedial measures. By this date, most stocks, outside of a few of the blue chips and public utilities, were selling at reasonable ratios to earnings.

However, as later events showed, liquidation had then only begun. Nevertheless, what has happened since January 1, 1930 appears to have been due almost entirely to unreasonable fear and pessimism. The effects of the decline have been almost wholly pernicious. Could this secondary and most disastrous part of the fall in the cycle have been prevented?

The probabilities are that, had proper measures been adopted, optimism could have been reestablished early in 1930. Two forms of assurance were necessary; first, assurance to employees that they would not lose their jobs; second, assurance to business men and to consumers that there would be no further general decline in prices. Had the second form of assurance been definite, the need for the first would have been much less intense, but would, nevertheless, have been necessary. With these two assurances there would have been little reason for buyers to reduce their volume of purchases far below their respective incomes. With a stable volume of buying there would have been no reason to lay off employees, business earnings would have been maintained, dividends would have been secure, and the national income would not have been seriously reduced.

For stabilizing employment no direct method has yet been proposed which promises to be both simple and effective. The attempt to remedy unemployment after it has developed by means of public work may often result in little more than giving one unemployed man a job at the expense of another. Is it not, indeed, probable that, whenever the money raised either by taxation or popular subscription results in the contributors reducing their purchases of production goods, new unemployment is created as fast as the old unemployment is remedied? May it not well be true that, unless the contributed money comes from funds which would otherwise not have been used in the immediate future to further production, no net gain in the volume of employment results?

The best direct measures for stablizing employment are, then, apparently those which are preventive rather than curative. Something can doubtless be accomplished by putting pressure upon each employer to guarantee a stable volume of employment in his enterprise. Compelling each employer during boom periods either to lay aside a large reserve fund, or to pay taxes to cover the cost of furnishing public employment during the preceding depression would lessen the tendency toward undue expansion. The expenditure of accumulated reserve

funds in periods of depression would increase the demand for goods at such times and would also provide considerable stocks of commodities which could not be marketed until business again became active. The marketing of these stored-up commodities would tend to prevent prices from rising unduly in times of prosperity.

There seems to be little doubt that, if every able-bodied would-be worker were assured by the government, in advance, that employment, even at low wages, would be available at all times, the tendency on his part to stop buying when depression appears would be far less marked than at present. Since stabilization of industry is so essential to the public weal, it seems then that the guaranteeing of steady employment at a wage at least somewhat above the subsistence level, ought to be one of the prime functions of government.

Direct measures for stabilizing employment are, however, at best difficult to carry out effectively. Fortunately, there is another method of contributing to the stabilization of industry which is, by comparison, simplicity itself. This method consists in manipulating the supply of money and deposit currency in such a way as to offset variations in the velocity of circulation, thus keeping the price level constant.

Were the public assured that the average of all prices would, under no circumstances, be allowed to deviate materially from a fixed level, there would certainly be much less probability either that exuberant optimism would develop wild booms or that unreasoning waves of pessimism would drag us down into disastrous business depressions.

Suppose, for example, that, in 1928, when the stock market was pursuing a runaway course and instalment buying was pushing orders for goods well above the national income, the Federal government had rapidly withdrawn money from circulation. Would such action not have dampened the ardor of the public, prevented the mad orgy of speculation which followed, and reduced the tendency to expand plant capacity in some lines so far that the products of those industries could not be marketed when the people came to spend less than the national income? Suppose further that, in 1930, when prices began to plunge downward precipitously, the proper Federal authorities had begun vigorously to pump new money into circulation. Would not this process have started prices upward, restored confidence, or optimism, and brought business back to normal by the middle of 1931? The most probable answer to each of these questions seems to be "Yes."

Economists are familiar with several ways of manipulating the money supply, any one of which would keep the price level on an even keel. The two simplest devices which have yet been proposed for use by the Federal authorities are:

1. Whenever the price level is below normal, let the Treasury buy Government bonds with greenbacks and then retire the bonds.

When the price level rises above normal, exchange bonds for greenbacks, retiring the greenbacks.

2. Whenever the price level is below normal let the Federal Reserve banks buy securities with Federal Reserve credit or notes. Whenever the price level rises above normal reverse the process.

To be effective under all conditions, both of these plans would needs give authority to the regulating body to vary the price of gold, or, in other words, to change the weight of the gold dollar. Only in this manner could reserves be protected and a gold backing for the currency be permanently guaranteed.

The difficulties in the way of gaining the benefits of price stability must be regarded as mainly political rather than economic. The opposition to such stability does not, however, lie in the fact that a fixed price level would injure any powerful section of the voters. Instability is allowed to continue mainly because of ignorance, conservatism, inertia, and prejudice. Until these are overcome, the chances of really making much headway in our endeavors to lessen the evil results of depression are, unfortunately, relatively slight.

DEPRESSION: ITS RELATION TO THE COMPETITIVE PRODUCTION OF DURABLE PRODUCTS

By Arch D. Schultz

At all times the rate of depreciation of consumers' goods is significantly related to the volume of business which may be transacted, but at certain times there is an accumulation of undepreciated consumers' goods which develops a deterring effect upon market transactions. We do not need to trade to have our wants satisfied when particular wants are satisfied with the use of Durable Goods which we already have, as distinguished from short-lived goods, that is, Repeat Sale products. There may, therefore, occur a reduction in the volume of exchanges after many durable products have been received in trade.

About two years ago I began to wonder just what the millions of producers of modern homes, radios, improved automobiles, electric household appliances, roads, and public building, etc., were soon to do for a living since they had supplied us with a goodly quantity of these products, most of which were still giving service, and in fact, will continue to serve us for a long time to come.

Let us reflect for a moment upon the exchange conditions between producers of clothing and the producers of automobiles. Persons who receive clothing in the process of exchange will be ready for further exchange in one year, let us say; but the persons who receive automobiles will not be in the market, let us suppose, for four years. It would seem because of the different natures of the two products in the exchange, that a repetition of the same exchange cannot again occur for perhaps four years.

Once these products are made, no further services from their producers are required except for periodic repairs and for replacement when they are dilapidated.

On the other hand, in the case of Repeat Sale goods, trading does not bring about a condition which destroys the reasons for trading. When bread is taken in trade, there is nothing in the situation to destroy the need of the services of bakers on the following day. Buying shoes, clothing, or going to a movie or concert does not prepare the consumer to stay off the market for a number of years or even a few months, because they are Repeat Sale goods, and a stable volume of business transactions can be built upon this type of product.

I believe that the competitive production of Durable consumers' goods has been the most important fundamental factor in bringing about the present condition of so-called depression.

We have, as an industrial machine, gone about supplying the wants for important durable products which have been developed during the

past decade in as rapid a manner as possible. Industry has not taken stock of the fact that it was equipping itself with a specialized labor population, specialized machinery and plants, and a highly specialized organization to operate them; and has not realized that replacements of products would require far less of this producing equipment than making the original supply. We built our equipment in the automobile industry for the purpose of constructing over five million units per year whereas the actual recurring need for automobiles is probably not over three million cars per year. As a consequence, we find that after we have supplied our market with the first cars, we have a large volume of capital in the automobile industry for which we have no use, and a large supply of labor for which we no longer have need. But fundamentally, this is due to the fact that cars last a long time.

There are some industries in a depressed condition to which this analysis does not apply. I have in mind the coal industry, the oil industry, and the growing of cotton and wheat. There may be others. It does, however, apply to a significant group of industries which experienced marked prosperity during the period from 1922 to the spring of 1929.

A surprisingly small proportion of the products which the average person has been consuming during the last decade is of the Repeat Sale type. We find that representative consumers have been buying modern houses, radios, automobiles, and electric household equipment with, perhaps, more than half of their income. The producers of these long-lived products received their pay, and in the spring of 1929, they began to sit by and idly wait until these products shall have been worn out or shall have become dilapidated.

I like to think of the condition which results from the purchase of such goods as a condition of Arrested Sales—Dead Sales, if you please.

But not only have we, as consumers, supplied ourselves with automobiles, radios, electric household equipment, modern furniture, and modern houses, but the industrial world which supplied these final products has also equipped itself with long-lived new machinery. Consequently, when most of the persons able to purchase long-lived products have been supplied with them, the market for them necessarily dropped in tremendous proportions; and the market of producers supplying machinery for their manufacture followed. Many other related industries likewise suffered because of the destruction of the conditions necessary for making exchanges between producers in different lines.

It appears that competition in the production of durable products has led industry to specialize a large part of the total supply of labor and capital for the production of a volume of output in excess of replacement requirements. The result has been unemployment and the loss of profit.

It should not be concluded from the considerations herewith pre-

sented that the proper course for industry to take would be to devise products which would not last a long time, supposing it were possible to make them capable of rendering quality service while at the same time making them so that they might have a short service life. This would be sacrificing the welfare of our people merely for the purpose of increasing the statistical proportions of the volume of business. We should not measure our welfare by a varying volume of sales. What people really want is the satisfaction of their wants with the least effort possible. The fact that an automobile cannot be sold to every user every year reduces only the statistical total of automobile sales, but does not reduce the total of satisfactions which the users of automobiles enjoy. The fact that the total volume of business in 1931 is below the average for a number of preceding years does not itself indicate that most people are not receiving as many enjoyments from goods as they did. On the contrary, I believe that it indicates that they have supplied themselves with most goods which they want, and now enjoy them without the necessity of additional effort. Assuming a continuity in the system of distribution, I might reasonably ask, and seriously, just what goods are available for many people to buy that they do not now have.

Explanations of the existing depression are often centered around some notion of over-production or under-consumption. Too often we explain the meaning of over-production as an excess supply of consumers' goods in the warehouses of manufacturers or distributors, and ignore the fact that the real place of the over-supply is in the hands of consumers. The real significant inventories of automobiles, radios, electric refrigerators, and materials for building houses are actually in the hands of consumers and in the completed houses. These inventories far outdistance in importance the inventories of the same goods in the hands of producers. Furthermore, since we have ignored the importance of the Unseen Inventory, there has been an over-production of the means of production, namely, plant machinery, buildings for productive purposes, etc. Of still greater significance is the fact that we have "over-produced" a supply of specialized labor. Because of the high marginal significance of new products, an improvement in industrial technique, and the consequent possibility of paying high wages, it has been possible for a number of years to draw laborers from the farm and from other Repeat Sale industries into the industries producing Durable goods. These men have been trained for particular operations. We have, therefore, over-produced the supply of labor in Durable product industries. The future demand for the services of this, now idle, supply of labor will come only in the proportion and at the rate that the inventory of Durable goods in the hands of the consumers passes into dilapidation and needs replacement.

This condition of Arrested Sales is closely connected with important changes in the rate of increase of population in the United States during

the past two decades, and particularly during the past six years. Before 1910 there was increase in population of two per cent per year. Since many reached mature ages during the past decade, there has been provided a considerable market for consumers' goods. For the past two decades, there has been an increase in population of slightly over one per cent per year. During the period from 1925 to 1930, the general increase in population was less than one per cent per year; some of the reduction may have been due to immigration restrictions. New sales of long-lived products must largely come, under the existing system of distribution, from replacements of dilapidated products already sold and from the coming to maturity of additions to the population. But there has not been a sufficient growth in population to require an increasing utilization of the means of producing long-lived products.

Industrial leaders had most of their experience during the development of decades of new inventions and decades of rapidly increasing population. They have come, therefore, to look upon business as requiring a large expansion from year to year, and have failed to take account of the fact that they were saturating the market with products which would not need replacing for a number of years. Furthermore, they have overlooked the fact that an inadequate number of new buyers would come to maturity to make up for the loss in market due to the long service life of a large body of products which they were selling. Not only must our plans for preventing further depressions, therefore, consider the length of the life of products, but must take account also of the decreasing rate in the growth of population.

I am confident that the present depression would have been much more severe had it not been for the fact that there was some development of new products of both the Durable and Repeat Sale type just before this depression began and during its worst months.

Perhaps the most pleasant way out of our difficulties would be to bring forth regularly a number of new products which would be desired by a large part of the population. The business expansion which took place during the past decade was primarily based upon the exploitation of important and universally desired products. Upon the invention of some of equal importance may well be built our future prosperity.

But if new products, such as television and family aircraft, are to be brought forth, shall we supply them under conditions of wild competition and thereby prepare ourselves for another depression? We may be saved from this hazard, however, by determining normal replacement requirements, and then through the cooperation of producers, determine upon a schedule of production which will not greatly exceed these requirements so as to avoid leaving any large number of laborers out of work when the first supply is completed. This applies as well to the replacement of the Unseen Inventory of existing Durable products. I

doubt very much that we can trust accident to provide us with a steady schedule in this replacement market.

Rather am I of the opinion that we must recognize in the organization of business the weakness which has brought about the present situation. This weakness I conceive to be the competitive production of Durable products. Under competition, few producers feel that they can withhold production without losing to their competitors a large share of the market. Thus, because of this competitive condition in the method of satisfying wants, there is danger that industry may again gear itself to produce far in excess of replacement requirements.

It may be asked by just what method industry may be reorganized. That problem is not one for the statistician. It may be suggested, however, that we must have no elements in the situation which will prevent cooperative activity. At the present time, the greatest hampering factors are the Federal and State laws regulating business, primarily, the anti-trust laws. It is not possible to say whether in the absence of such hampering restrictions, business could cooperate; but a modification of these laws would give business an opportunity to attempt such cooperation for the scheduling of the production of Durable products.

THE EXIT FROM THE DEPRESSION

(An Address) *By* Frederic Bennett

"Hence loathéd Melancholy, of Cerberus
and Blackest Midnight Born"

—Milton.

Mr. Chairman and Gentlemen:

As I have neither the honour of being an American citizen nor the characteristic of being particularly 'statistical', it is a very special privilege to me to have been invited by Doctor Ogburn to put some of my views before The American Statistical Association.

I think that what prompted your President's kind action was the fact that some attention has been drawn to a paper circulated in July 1930 and re-edited in May 1931 wherein I explained the basic cause to which I attributed and to which I continue to attribute nearly the whole of the world-wide depression.

To state my views extremely briefly, I believe that the key lay in those words of Secretary of Commerce Lamont, in his preface to The Department of Commerce's Report on the Balance of International Settlements for 1929, where he called attention to the fact that during the fifteen months preceding October of that year an additional $307,000,000 in gold had flowed into the United States, "equal to about 3% of the total gold stock of the world. Delivered in this country, after it had reduced the credit bases and purchasing power of the outside world, the gold apparently served no useful purpose; it mearly enhanced our already large stock of 'free gold'."

Written within a month of the issue of the Young Plan five and a halfs and at a date when United States Steel Common was still quoted at 157, my paper of July 1930 ended as follows:—

> "If we wait for Germany to repudiate the reparations, or even to declare a moratorium, we are going to wait until the financial chaos in Europe is much worse than it is now, with either Bolshevism or Fascism more rampant and our depression here correspondingly worse in inevitable consequences.
>
> "It is believed that this whole idea would be acceptable to the American people if only a concerted effort were made to explain it. BUT NOTHING IS BEING DONE.
>
> "It is believed that real prosperity might be restored long before the Presidential election if only something were done almost immediately to effect these steps, but that otherwise this is absolutely impossible."

This extract will show you what I was attacking; namely the segregation and sterilisation of gold that had been taking place here, as a result of the war-debt collections in combination with American Fiscal policies. To this sterilisation I attribute the contraction of the world's credit structure and the consequent fall in the general level of commodity prices.

It is a common error to suppose that the fall of commodity prices has been a phenomenon only evidenced since the stock market collapsed in 1929, but actually it had commenced long before that, indeed, with the exception of a short period of 1927 and 1928, during which the level of prices rose due to the exportation of large quantities of gold from the United States, the fall had been in existence as a certain harbinger of the crash even since the beginning of 1925.

Now, apologists high and low are maintaining that gold was not sterilised here, yet Secretary Lamont's words that I have already quoted prove how groundless is their apology ,and if further authoritative contemporary documentary evidence is required, it is readily available.

Gentlemen, I am aware that it can be plausibly demonstrated statistically that the proportion of gold now in the United States is justified by the proportion of the world's income that belongs to this country and also by the proportion of the world's commerce that is internal in this country, yet, as the National City Bank pointed out recently in one of its Economic Surveys:—

> "It is something to ponder over that the Bank of England, with gold reserves today less than $700,000,000, is clearing more international business, and rendering more international aid to business, than the banking and currency systems of the United States and France together, although the gold holdings of these two countries aggregate over $7,000,000,000. These figures afford a convincing demonstration that something other than a lack of gold in the world is responsible for the present disordered world situation."

The striking fact must also be realised that at the end of 1913, when England was so incredibly rich, and when practically the whole of international trade was financed from London, the Bank of England then held actually less than $200,000,000 of gold reserves. At that date nearly all the gold in the world could have been attracted to London by stiffened bank rates, but London understood that its prosperity depended, as that of the United States most assuredly depends today, on the keeping of the world's gold circulating as a basis of credit structures in all countries, instead of allowing it to pile up and to become sterilised in the coffers of the great creditor.

I have never been in any way impressed by the arguments presented which have compared the duration of this depression with that of

previous ones and hence have sought hope as to its early approaching end.

Every depression ends only when its causes have been removed, and in connection with this thought I want to draw your attention to two points which I believe to be extremely important; two aspects in which this depression differs fundamentally from all its predecessors.

The first of these points concerns us here in the United States most particularly; it is because this depression follows an inflation during which, for the first time in the world's history, organized labor had the political power to force up its wages step by step exactly in line with the rise that had occurred in wholesale commodity prices. The effect of this was that a condition arose where all real estate and plant valuations became inflated similarly and, while thus inflated, say between 1921 and 1930, became the basis of mortgage bond issues or real estate mortgages.

This is why we have a situation which cannot be cured by the 'completion of deflation' process which some of our highest authorities are unfortunately still advocating. Indeed the process of deflation would have no bottom, as every mortgage foreclosed becomes an equity in the hands of an unwilling holder, and thus a self-devouring equity.

Of all countries, the United States is most vulnerable to this 'deflation' danger—"deflation mania" as Dr. Gustav Cassel has called it—as here alone it is the custom for *sound* concerns to do their normal financing by means of the issuing of first mortgages and here alone psychology decrees that for a man to have a first mortgage out against his real estate, or on his home, is almost normal, instead of its being somewhat of a skeleton in the family cupboard as is the case in the older countries.

The second point wherein this depression differs from all preceding ones also affects the United States most particularly. It is nothing less than the fact that out of all previous depressions this country has been led, or at any rate greatly assisted, by the purchasing power that has been created here by European, and particularly English, investments.

Now, for the first time, the world must be led out of depression by constructive action originating in the United States.

I urge you, Gentlemen, to believe that it is not by conservatism or by 'sticking to our knitting' that this leadership can be given.

Ignorance, futility, inaction and fear are what may be often found hiding behind the mask to which the name of 'conservatism' is given.

Action is long over due and to be effective that action will have to take the form of that hated word 'inflation'. Ought we not to banish that word and to replace it by some such beneficent term as 'reconstruction' or 'recuperation'?

Personally I should like to see the word 'inflation' become synonymous with 'economy of gold'.

What an illusion the price level is! A few hundred years ago the price of a whole sheep was sixpence yet only very rich could afford to eat mutton. Now the price of a pound of mutton is three times as much as that of a whole sheep was then, yet now everyone can afford to eat mutton.

What has brought about this fundamental change? The answer is the inflation of currency or, more exactly, the inflation and the improvement of credit facilities.

Over the centuries, civilization has extended and the amenities of life have improved almost exactly proportionately to the degree to which currency has been inflated in this controlled and orderly sense. Yet how many bankers of the highest standing there are today who look upon inflation as something to be feared and something to be abrogated as a national financial policy.

How often have we heard it said recently that the only cure for our present ills is to get on with the process of deflation, to stabilize at lower levels, to take our medicine bravely and get it over.

Gentlemen, there is no bottom to deflation. Its end is chaos. As someone has said recently, we cannot imagine chaos overtaking this country but remember that neither could the Germans imagine it in their country until it came and overwhelmed them.

The Great War is said to have cost this country thirty-five billions of dollars; I have seen it estimated that this deflation has already cost the United States two hundred billions!

Eighteen months ago I showed how the depression had been caused and was being continued by an attempt to collect a paltry two or three hundred million dollars a year of economically uncollectable war-debts. Not one word of my argument has been effectively controverted because not one word of it is controvertible. Steel was then selling at $157, the New York Central was paying $8.00 per share; the taxable income of the United States has since fallen by seven billion dollars annually; the working men's payroll in New York State alone is down by a billion and a quarter annually. What irony, and irony upon what a tragic scale!

Day by day, now, influential voices are repeating this view. Mr. G. P. Auld, formerly Accountant General of the Reparations Commission, in addressing the New York Society of Certified Public Accountants, recently spoke as follows:

> "It is useless to expect Europe to solve the reparation question by itself. Too many practical facts tie the inter-ally debts into one indivisible whole with reparations. Two-thirds of the reparation payments normally come through to us. The Allies are, in fact, largely out of the picture, and we in reality are face to face

with Germany for the adjustment of this most formidable of all the problems left by the War.

"To this country the maintenance of the reparation system, through the maintenance of inter-ally debts, means nothing in comparison with our stake in the stability of Europe."

La vérité est en marche et rien ne l'arrêtera.

Now let me try to apply a little perspective:—

What a fine sight our world would be today if a visitor could come to us from Mars! He would find our granaries groaning with grain, our warehouses bursting with merchandise and luxuries, our harvests super-abundant. Yet he would find starvation stalking the streets of the cities even in our wealthiest countries. He would go back to Mars and say "those people on the planet Earth are mad."

The Martian Statistical Association might then be called into conference and they would hear that a commodity called "gold" had been adopted by the inhabitants of Earth as a basis upon which alone the nations of Earth felt themselves justified in raising credit structures; that strange sets of circumstances had decreed that great debts should be due to certain countries, payment of which those countries seemed to want to accept only in gold; that as a result of this, three quarters of the gold in the planet Earth had drifted into two countries where it had been put away for fear of what they called 'inflation', and that a further result all the other nations of Earth had little gold on which to raise credit structures, so that the commerce of the planet had virtually ceased in spite of the plethora of good things with which Earth abounded!

"This Conference must be called to order", the Martian Chairman would surely say, "Your report is fantastic and utterly incredible."

Returning to earth: when a tyre is flat it may want a patch, but then what it most surely needs is inflation; similarly when business is flat, particularly when it is flat as a result of an overdose of deflation artificially applied to it, its urgent need is surely re-inflation.

There is no time to be lost; evidence is available on all sides that the world crisis is likely to be accentuated during the next few weeks. In fact we seem to be on the verge of a complete breakdown of the international credit and commercial system, with incalculable consequences, social and political, as well as financial.

May I most urgently draw to your attention the rallying point provided by paragraph 267 of the MacMillan Report, which reads as follows:

"We are emphatically of the opinion that, even if a further fall of wholesale prices be avoided, their stabilization at approximately the present level would be a serious disaster for all countries of the world alike; and that the avoidance of such an event should be a prime object of international statesmanship."

Unfortunately, organized international effort to this end is viewed with suspicion and the most practical course is for each country to take action in its own interest, the lead being taken by the most powerful creditor nations.

The vicious circle can only be cured by a rise of world prices, which will make production remunerative and begin to restore our equities.

What is necessary is that a largely increased supply of money should be forced into circulation. This can be done in a multitude of ways, the least controversial of which is for the Federal Reserve System to pursue and to maintain a vigorous and consistent policy of open market purchases, while maintaining or rather resuming extremely low rediscount rates.

Now it will be believed and said by some of you that this method has already had a fair trial, and that it has failed for the reason that when confidence is lacking and when business is contracting, corporations and individuals cannot be induced to borrow.

But I ask you *has* it ever been tried vigorously and consistently? I think not.

After the stock market collapsed in 1929 the Federal Reserve Banks bought about $450,000,000 of bonds, bringing their total holdings to about $600,000,000, and then stopped. So long was the delay in continuing the process that confidence, which certainly was not at a low ebb during the spring of 1930, began to flag. If those bonds holdings had been vigorously increased by say another five hundred millions before this ebbing of confidence began, I think that the depression would have been checked, and, if its basic cause to which I have alluded had then also been removed, real prosperity would have rapidly returned to us.

But in default of such measures, confidence continued to wane, with the result that, when open market purchases were resumed, it had sunk so low that the commercial banks were in a frame of mind to reduce their discount borrowings sufficiently to neutralise the Reserve banks' efforts almost entirely.

Then came a time when rediscounts had fallen to an apparently irreducible minimum, but by then the hoarding of currency by the public had commenced. If this had not been checked, the situation would indeed have become hopeless, but mercifully it was checked by the psychological effect of the setting up of the National Credit Corporation and by the suggestion of other reconstructive measures by President Hoover.

Gentlemen, I think it is not yet too late for this comparatively conservative method method to be successful if it is applied immediately, vigorously and consistently, and with an intent to succeed.

I agree that business will not immediately borrow any of the funds made available, but the fact that borrowers are not waiting for credit

does not mean that the additional credit made available will not be used.

The enormous additional deposits forced upon the member banks will not be allowed to remain idle; the banks will devote them to the purchase first of highest grade bonds and, with surprising rapidity, a real bond market will be upon us.

The increased supplies of money made available must ultimately mean expansion of credit, increased bond and stock prices, and a gradual restoration of business solvency. Some of the money may be hoarded but hoarding is not unlimited, and such hoarding as there is will cease when the inevitable signs of improvement begin to appear in the banking situation and in business.

Gold may be exported, but it can well be spared, and its export will tend to raise prices abroad and so tend to stimulate revival of the purchasing power abroad, which is so vitally necessary for many American products.

I believe that the adoption of this policy in the United States *alone* would effectively accomplish revival of the business of the world, but it might be hoped that the example would be followed elsewhere and the restoration of prosperity would then be all the quicker.

And Gentlemen, let me urge this one last thought upon you with all the emphasis that it at my command, with all the power of expression and with all the power of persuasion of which I am possessed. If at the same time the United States of America would lead the World in calling an International Conference to discuss the gold situation and the general level of commodity prices in their inter-relation with the war-debts and reparations, I believe that findings would emerge, upon which policies would be based, which would lead the world into a prolonged period of prosperity the degree of which has never yet been equalled.

30th December, 1931

MINUTES OF THE ANNUAL BUSINESS MEETING

A business meeting of the American Statistical Association was held on Tuesday, December 29, 1931, at the Hotel Washington, Washington, D. C. A motion was carried to dispense with the reading of the minutes of the preceding meeting.

Mr. George H. Van Buren presented his report as representative of the American Statistical Association on the National Conference on Nomenclature of Disease.

The Secretary of the Association read the report of the Joint Advisory Committee on the Census, submitted by Walter F. Willcox of that Committee.

Walter A. Shewhart, representative of the American Statistical Association on the Joint Committee for the Development of Statistical Applications in Engineering and Manufacturing, presented the report of that Committee.

The report of the Committee to Coöperate with the Social Science Research Council was presented by the Chairman of that Committee, Frederick C. Mills. A motion was seconded and carried to approve the report and transmit it to the Social Science Research Council.

The following proposed amendment to the Constitution, adopted at the Annual Meeting of 1930, was brought forward for consideration:

> "The last sentence of Article VIII shall be amended to read as follows:
> "The President, Vice-Presidents, Secretary, Treasurer, *the Vice-Presidents for the preceding year,* and the person or persons holding the Presidency of the Association during the two preceding years shall form the Board of Directors for the government of the Association, three of whom shall constitute a quorum at any meeting regularly convened."

A motion was made and duly seconded to approve this amendment. This motion was defeated.

The following proposed amendment to the Constitution, which passed at the Annual Meeting of 1930, was adopted by unanimous vote:

> "Proposed to amend the first line of Article VIII of the Constitution to read:
> "The Officers of the Association shall be a President, *eight* Vice-Presidents, * * * * *"

The following proposed amendments to the Constitution received a favorable vote and were placed on file for final consideration by the Annual Meeting of 1932:

> Article VIII to read:
> "The officers of the Association shall be a President, a Secretary-Treasurer, six other Directors, eight Vice-Presidents, the Editor of the Journal and the Editor of the Annals. Each of the Vice-Presidents shall represent a distinct

field of statistical interest, the field to be represented being designated by the Board of Directors. The President, Vice-Presidents, Secretary-Treasurer, and Editors shall be elected each year beginning with the Annual Meeting at which this amendment to the Constitution is adopted, the manner of their election being prescribed in Article IX. The six Directors, other than the President and Secretary-Treasurer, shall be elected at the Annual Meeting at which this amended Constitution is adopted, two for a term of one year, two for two years, and two for three years. Thereafter, two Directors shall be elected each year for a term of three years, the manner of their election being prescribed in Article IX. These Directors shall not be eligible for reelection until one year has elapsed after leaving office. All elected officers shall take office at the close of the Annual Meeting at which elected. The President, Directors, and Secretary-Treasurer shall form a Board of Directors for the government of the Association, three of whom shall constitute a quorum at any meeting regularly convened. The Vice-Presidents shall constitute advisors to the President and Secretary in the preparation for annual and special meetings, and in matters concerning the interests of the groups they represent in the membership of the Association.

"In case of the incapacity of the President to act on any occasion, the Secretary-Treasurer shall designate which of the Vice-Presidents shall act as President."

Article IX to read:

"The President, Secretary-Treasurer, other Directors, Vice-Presidents, and the two Editors shall be elected in the following manner. The President shall appoint a Nominating Committee of three members, the personnel of which shall be announced in the quarterly publications of the Association at least three months before the Annual Meeting. It shall be the duty of the Nominating Committee to make nominations for officers to be elected at the Annual Meeting, and to notify the regular members and fellows by mail of its nominations at least thirty days before the Annual Meeting. Twelve or more regular members or fellows may make nominations for any office by submitting signed petitions to the Nominating Committee at any time after the appointment of the Committee and up to the time of the Annual Meeting, but this shall not prevent the committee from making additional nominations for the same office.

"If no nominations by petitions are submitted for any office, the nominee of the Nominating Committee may be elected at the Annual Meeting by viva voce vote. If there are additional nominations by petitions for one or more offices, it shall be the duty of the Nominating Committee to announce such nominations, the election for such office or offices shall be by ballot, and the President shall appoint three judges of election who shall count the ballots, shall decide any questions that may arise as to validity of any ballot, and shall declare the results of the election. The candidate for President, or for Secretary-Treasurer, or for Editor of the Journal, or for Editor of the Annals, receiving a plurality shall be declared elected, while the six candidates for Directors and the eight candidates for Vice-President receiving the highest number of votes shall be declared elected."

The following amendments to the By-Laws were unanimously adopted:

By-Law 3 shall be amended to read:

"The Board of Directors, as soon as practicable after the adoption of this amended By-Law, shall appoint two standing committees, one on Policy and Finance, and one on Research, each committee to be composed of six members.

"Two members of the Committee on Research shall be appointed for one year, two for two years, and two for three years. Thereafter the Board shall appoint two members of this committee annually for terms of three years.

"The President of the Association shall be a member, ex-officio, of each committee. The Board of Directors shall appoint such other committees as in its judgment are deemed necessary for carrying on the activities of the Association. These committees shall serve for one year or until their successors are appointed."

By-Law 4: "The Board of Directors, as soon as practicable after their election, shall appoint five associate editors of the Journal and Proceedings and five associate editors of the Annals to aid the respective Editors in editing the publications named above. The associate editors shall serve for one year or until their successors are appointed."

By-Law 6: "This By-Law shall be repealed."

The second session of the business meeting of the American Statistical Association was held on Wednesday, December 30, 1931, at the Hotel Washington, Washington, D. C.

The report of Edwin W. Kopf, Representative of the American Statistical Association on the American Year Book, was read by the Secretary.[6]

The Secretary also read a brief communication from Edmund E. Lincoln, Chairman of the Finance Committee.[7]

Edmund E. Day, the Representative of the American Statistical Association on the Council of the American Association for the Advancement of Science, also sent in a brief report which was read by the Secretary.

Malcolm C. Rorty, Chairman of the Committee on Nominations, submitted the following nomination for the various offices of the American Statistical Association:

President ..... Irving Fisher

Vice-Presidents:

Collection and Classification of Data and Administration of Statistical Agencies ..... Leon E. Truesdell

Statistical and Actuarial Methods and Technique and the Teaching of Statistics ..... William L. Crum

Facts and Methods Pertaining to Political Science, Sociology, Social Welfare, Labor Problems and Vital Statistics ..... Mary Van Kleeck

Facts and Methods Relating to Anthropology, Biometry, Psychology, and Education ..... Lowell J. Reed

Facts and Methods Bearing on Economics and Economic Theory
..... Horace Secrist
Facts and Methods Pertaining Primarily to Business.....
.....Seymour L. Andrew
Secretary-Treasurer .....Willford I. King
Editor of the Journal .....Frank Alexander Ross

A motion was carried instructing the Secretary to cast the unanimous ballot of the Association for the nominees of the Committee. This was done.

The Secretary's report, presented by that officer, was accepted by unanimous vote.

The Treasurer presented his report which was also accepted by unanimous vote.

In the absence of Harry C. Carver, the Editor of the Annals, his report was read by the Secretary.[1]

The report of the Committee on Fellows, presented by the Chairman, Horace Secrist, was read by the Secretary.[2]

Howard W. Green, Chairman of the Committee on Census Enumeration Areas, presented his report.[3]

Malcolm C. Rorty, Chairman of the Committee on Monographs, presented the report for that Committee.[4]

Horatio M. Pollock, Chairman of the Committee on Institutional Statistics, read his report.[5]

Miss Mary van Kleeck, Representative of the American Statistical Association on the Joint Committee of the Encyclopaedia of the Social Sciences, reported for that Committee.

A report, submitted by Edgar Sydenstricker, representative of the American Statistical Association on the Social Science Research Council, was read by the Secretary.

Miss Mary van Kleeck presented the report of the Committee on Governmental Labor Statistics.

John H. Cover presented a report for the Committee on Real Estate Statistics.

The meeting adjourned.

WILLFORD I. KING, *Secretary.*

REPORT OF THE SECRETARY

Membership December 1, 1930			2,267
Additions during 1931		313	
Deductions during 1931:			
Deaths	7		
Resignations	153		
Dropped because unable to locate	6		
Dropped for non-payment of dues	146		
		315	
Net loss in membership during 1931			2
Membership, December 1, 1931			2,265
Besides members we have:			
Journal subscrbers, mostly libraries		565	
Journal domestic exchanges		23	
Journal foreign exchanges		25	
			613
Subscribers to the Annals of Mathematical Statistics, libraries, regular and honorary members...		239	
Annals domestic exchanges		2	
Annals foreign exchanges		3	
			244
Total members, subscribers and exchanges			3,122

The following deaths were reported during the year:

Professor Ladislaus von Bortkiewicz
Dr. Lee K. Frankel
Professor Franklin H. Giddings
Miss Henrietta Kiernan
Mr. Marcus Meltzer
Mr. P. W. Morgan
Mr. Marvin Z. Jones

Four numbers of the JOURNAL, containing 500 pages, together with the Proceedings Supplement, containing 287 pages, have been issued in 1931. These compose Volume XXVI.

There were 29½ pages of paid advertising in the four issues of the JOURNAL.

Volume II of the ANNALS OF MATHEMATICAL STATISTICS was published in 1931 and comprised four numbers, containing 492 pages.

During May, 1931, a new district organization was formed in Albany with 38 charter members. The officers elected were: President, Horatio M. Pollock; Vice-President, Roy L. Gillett; Secretary-treasurer, David M. Schneider; Members of Executive Committee, Warren W. Coxe and Sidney W. Wilcox.

We have reports of meetings held by district organizations as follows:

Chapter	*Number of Meetings*	*Average Attendance*
Austin	1	21
Boston	2 (Joint)	149
Chicago	6	65
Cleveland	(1	106
	(9 (Business Section)	26
Columbus	8	43
Los Angeles	6	15
New York	8	192
San Francisco	4	31
Districts		
Albany	3	23
Detroit	3	20
Pittsburgh	12	32
Washington	0	

WILLFORD I. KING, *Secretary.*

REPORT OF THE TREASURER

Covering the Period December 1, 1930 to November 30, 1931

GROSS RECEIPTS AND DISBURSEMENTS

Cash on hand December 1, 1930	$ 776.22	
Gross cash receipts during year	24,624.60	
		$25,400.82
Gross cash disbursements during year		23,379.31
Cash on hand November 30, 1931		$ 2,021.51
Gross cash disbursements during year	$23,379.31	
Refunds	714.10	
Gross Expenses		$22,665.21

FUNCTIONAL APPORTIONMENT OF GROSS EXPENSES
(Including Overhead)

Annual meeting and New York meetings	$ 3,989.89	
Journal and Proceedings	12,123.11	
Annals	1,275.19	
Employment Clearing House	406.17	
Securing new members	629.28	
Miscellaneous	4,241.57	
		$22,665.21

NET RECEIPTS AND DISBURSEMENTS

Cash on hand December 1, 1930		$ 776.22
Gross cash receipts	$24,624.60	
Refunds	1,481.99	
Net cash receipts during year		23,142.61
Total		$23,918.83
Gross cash disbursements during year	$23,379.31	
Refunds	1,481.99	
Net cash payments during year		$21,897.32
Cash on hand November 30, 1931		$ 2,021.51

ITEMIZED STATEMENT OF NET RECEIPTS AND DISBURSEMENTS

Cash on hand December 1, 1930		$ 776.22

NET CASH RECEIPTS

Individual membership dues	$11,211.92	
Life and contributing membership dues	100.00	
Corporate dues	700.00	
Subscriptions to Journal	3,190.56	
Subscriptions to Annals	1,163.65	
Journal Sales	1,684.81	
Advertising	491.00	
Receipts from authors for reprints	458.90	
New York meetings	2,985.75	
Interest on bonds and deposits	544.67	
Dividends	218.75	
Memorial Volume	158.48	
Sale of miscellaneous books to members	234.12	
Total net receipts		$23,142.61
Total		$23,918.83

NET CASH DISBURSEMENTS

Cost of Journal:		
December 1930 edition, including reprints	$1,389.85	
1930 Handbook	695.77	
March 1931 edition, including reprints	1,201.21	
Proceedings, including reprints	2,198.58	
June 1930 edition, including reprints	1,251.17	
September 1930 edition, including reprints	1,274.53	
		$8,011.11

Cost of Annals	$1,000.00	
Printing, Postage, and Stationery	1,366.69	
Salaries	7,694.08	
Rent	328.00	
New York Meetings	2,506.02	
Telephone and Telegraph	97.38	
Annual Meeting	284.44	
Miscellaneous expenses, Editor's office	106.57	
Journals bought back	243.89	
Cost of shipping Journals	51.08	
Miscellaneous books sold to members	97.21	
Miscellaneous expenses, Secretary's office	110.85	
Total net disbursements		$21,897.32
Cash in checking account, National City Bank, November 30, 1930	$1,062.13	
Cash in Emigrant Industrial Savings Bank	872.84	
Cash on hand, not deposited, November 30, 1931	86.54	
		2,021.51
Total		$23,918.83

On November 30, 1931, the Association possessed, in addition to stationery and miscellaneous supplies, the following assets:

Cash on hand	$2,021.51
Furniture carried at	354.92
Accounts receivable (unpaid advertising)	15.00
Journals and Proceedings, 9,232 copies	
Memorial Volume, 5 copies	
Bonds—market value November 30, 1931, plus accrued interest	6,893.34
Common, (guaranteed) and preferred stocks—market value November 30, 1931	2,646.50

All bills presented to the treasurer have been paid.

WILLFORD I. KING, *Treasurer*

REPORT OF THE AUDITING COMMITTEE

We have examined the books and records in the office of the Treasurer of the American Statistical Association and have verified the bank balances.

We hereby certify that the Treasurer's report submitted is in accordance with the books and records, and, in our opinion, correctly represents the financial condition of the American Statistical Association as of November 30, 1931, and receipts and disbursements during the year December 1, 1930, to November 30, 1931.

(Signed) LAWRENCE WOLFF
(Signed) EDWIN W. KOPF
Auditing Committee

New York, N. Y.
December, 1931

REPORT OF THE EDITOR OF THE JOURNAL

The current depression has had little physical effect on the *Journal* due to the able work of Dr. King in maintaining the income of the Association on a level adequate to maintaining the budget. The number of pages printed during 1931, as set forth in the Secretary's Report, was approximately the same as that of other recent years.

As to the quality of those pages, however, great improvement is felt to have come. Whether or not causal relation exists, the Editor has discovered that a far larger number of higher quality papers have been submitted during the present unpleasantness than in preceding years of great prosperity. One has but to point to the articles by M. C. Rorty, B. B. Smith, W. F. Willcox, and R. Frisch and B. D. Mudgett—to choose four—for substantiation of this statement. Further, there has been forced a keener competition for space among authors. Where heretofore it has frequently been necessary to include at the last moment a paper of inferior grade, there are now two advance issues in practically final make-up in the office at all times. It is becoming increasingly difficult to avoid a six months' lag in publication.

Professor Harry C. Carver, Editor of the *Annals of Mathematical Statistics*, is editing the current issue of the *Proceedings of the American Statistical Association*. The Association is very fortunate and the Editor of the Journal extremely grateful.

As usual the Editor of the Journal wishes to thank Dr. Leo Wolman, the Review Editor, for his untiring efforts and the large number of informal editors who have contributed so much in critical analysis of papers before publication.

FRANK A. ROSS,
Editor, Journal of the American Statistical Association.

REPORT OF THE EDITOR OF THE ANNALS

The *Annals* is now two years old, and its present list of subscribers and contributors—both here and abroad—is extremely gratifying. There is no longer a dearth of material—our greatest problem now seems to be concerned with finding sufficient space for presenting the results of the researches of American and foreign mathematicians.

Thanks to the efforts of our publishers, Edwards Bros., the appearance of the issues has greatly improved. To appreciate this one need only compare Vol. 1, No. 1, with Vol. 2, No. 4.

The Editor of the *Annals* wishes to take this opportunity to express his indebtedness to Professor Ross, the Editor of the Journal, for his most cordial coöperation, and to the individual members of the Board of Directors of this Association for the moral and financial support that they have so generously contributed in launching this new enterprise.

(Signed) HARRY C. CARVER
Editor of the Annals of Mathematical Statistics

REPORT OF THE COMMITTEE APPOINTED TO ADVISE ON A PROGRAM OF RESEARCH IN STATISTICS AND ON RELATED MATTERS OF ASSOCIATION POLICY

To the Board of Directors of the American Statistical Association:

1. The American Statistical Association has certain responsibilities in connection with the promotion of research, the development of statistical theory and methods of statistical analysis, and the improvement of basic statistical data. The Association should accept these responsibilities, should so modify its organization that these responsibilities may be effectively discharged, and should take measures to secure the necessary funds.

2. The following should be the chief objectives in such modification of organization:

a. The creation of a permanent agency charged with responsibility for the furtherance of statistical research.

b. Provision for continuing contact with the officers and staff of the Social Science Research Council and with other institutions and organizations concerned with statistical research.

c. The creation of a permanent agency charged with responsibility for the continuing review of Association problems of policy and finance.

d. Provision for the administration of funds entrusted to the Association for purposes of administration and research.

3. *Organization for the furtherance of statistical research.* As a means of attaining the first two objectives, we recommend the creation of a standing Committee on Research, to be composed of six appointed members and the President of the Association, serving ex-officio. In the first year, two of the appointed members should be named for a term of one year, two for two years and two for three years. Vacancies would be filled thereafter by the appointment of two members each year, each to serve for a term of three years.

The Activities of this Committee would be of three types:

a. Activities directed toward the refinement and improvement of statistical theory and methods of analysis and the dissemination of information concerning advances in statistical methods.

b. Activities concerned with the improvement of the basic data of the statistical sciences.

c. Services as a board of strategy, in the planning of such general research activities as may from time to time be deemed consistent with Association policy.

In the furtherance of these ends the Committee on Research would serve as an agency for the establishment of co-operative relations with other associations and organizations concerned with statistical research.

Improvement of statistical theory and methods. Two clearly defined functions of the Committee on Research have to do with statistical theory and methods on the one hand, and with statistical data on the other. We believe that the efficient performance of the first of these functions will require the creation of a permanent Committee on Statistical Theory and Methods, a committee which will operate as a distinct entity under the general supervision of the Committee on Research. The general function of this Committee would be to stimulate the improvement of statistical technique, to call the attention of statistical workers

to unsolved methodological problems and to technical methods of questionable validity, and to disseminate among statistical workers in all scientific fields knowledge of current technical developments.

As one means of attaining these ends we recommend that the Committee on Statistical Theory and Methods assume responsibility for the preparation of a series of monographs on statistical technique. These monographs will in part serve the purpose of clarifying thought and disseminating information concerning aspects of technique which have been undergoing change, and with reference to which contemporary practice may be lagging behind the best contemporary thought. Monographs may be planned, also, in fields in which there are important unsolved problems which offer prospect of solution under a combined attack by specially qualified persons.

As illustrations of the studies proposed we suggest six fields in which the preparation of monographs by well-qualified statisticians would serve to clarify current thinking and to improve current practice.

a. The analysis of time series.
   A critical appraisal of all methods currently employed in the analysis of observations ordered in time and in the measurement of correlation between time series.
b. Homogeneity and stability.
   A survey and summary of recent contributions on these subjects, and an evaluation of methods employed in testing for homogeneity and stability.
c. Correlation and variance.
   A critical review of correlation technique in all its aspects.
d. The concept of "efficiency" in its bearing on statistical methodology, on the planning of statistical research and on the collection of statistical data. (The reference here is to R. A. Fisher's highly important contribution, the implications of which have not as yet been fully investigated.)
e. Sampling, distribution theory, and tests of significance.
   A treatment comprehending the problems encountered in dealing with both large and small samples.
f. The problem of statistical inference, with reference to Bayes' theorem and to the method of maximum likelihood.

The precise procedure to be employed in the preparation of these monographs will be determined by the Committee on Statistical Theory and Methods. We would suggest, however, that the Committee follow the general method employed by the National Research Council in sponsoring the series of monographs issued under its auspices. In accordance with this procedure a small group of well-qualified persons would be asked to collaborate on each task, under a general chairman charged with responsibility for the actual preparation of the monograph.

In the performance of its functions the Committee on Statistical Theory and Methods might find it desirable to prepare, annually or biennially, a critical review of contributions to statistical methodology. Articles on statistical methods are published at present in widely scattered journals. There exists no thoroughly satisfactory intelligence service for acquainting statisticians with new developments over the wide range of inquiry into statistical procedures, and no agency which might subject such developments to reasonably prompt appraisal. We suggest that there is a service to be performed here, to which this committee should give careful consideration.

Improvement of statistical data. Those activities of the Committee on Research which are directed toward the improvement of statistical data would in many cases involve action in co-operation with the several associations of scientists employing statistical methods in research. Projects for data gathering and for data improvement may not be carried forward without reference to specific research purposes. The definition of these purposes is a task for economists, sociologists, political scientists, anthropologists, psychologists, biologists and other scientists cultivating particular disciplines. But the services of the statistician are just as essential at the planning and data-gathering stages of an investigation as at the stages of analysis and interpretation. The rendering of these services would constitute one important function of the Committee on Research. Directly, and through subordinate committees, it would be charged with responsibility for the stimulation of efforts to improve the data of the statistical sciences. The co-ordination of all the activities of the Association which relate to the gathering and authentication of statistical data in the different departments of human knowledge would be effected through the Committee on Research.

The Committee on Research, in consultation with representatives of other associations, and of federal, state and private agencies, should maintain a continuous effort to secure data more adequate to scientific needs. The actual work in a field suitable for cultivation would not be done by the central committee, but by a body organized on its recommendation, and interlocking, if necessary, with related associations. The central Committee on Research should exercise general supervision over the work of such field committees, possibly requiring periodical reports.

In fields of research covered by well organized and active associations the work of the committees on statistical data would be necessarily co-operative in character. In fields, such as that of public health, which are not well organized, or in which little activity is shown by existing associations, the Statistical Association may be called upon to play a leading role in augmenting and improving statistical records. The Committee on Research might well initiate activity directed toward a critical appraisal of the statistical work now carried on by federal and state agencies, with reference to current economic and social problems and the needs of social scientists.

We may not here specify the manner in which the results of work in this field may be made public. In many cases the improvement of statistical records may be effected without formal publication of any sort. Brief reports will doubtless appear in the annual *Proceedings*. It is possible that circulation in monograph form of the results of certain surveys and appraisals would be justified.

We recommend that existing committees of the American Statistical Association concerned with the improvement of data (namely the Committee on Governmental Labor Statistics, the Committee on Social Statistics, the Committee on Institutional Statistics and the Committee on Price Statistics) be brought within the system here proposed, acting as field committees under the central Committee on Research.

4. *Policy and Finance.* As a means of ensuring continuity of policy in the administration of the American Statistical Association and continuity of control in the administration of funds, and of securing a continuing review of Association policies, we recommend the creation of a standing Committee on Policy and Finance, with revolving membership. We recommend that, as first constituted,

the committee include six appointed members, two named for a term of one year, two for two years, and two for three years. Vacancies would be filled thereafter by the appointment of two members each year, each to serve for a term of three years. No member should be reappointed until at least one year had elapsed after the expiration of a term in office. The President of the Association should be a member, ex-officio, of this Committee.

In an accompanying statement we submit a recommendation that there be created an Administrative Board, which should be the central governing body of the American Statistical Association in all matters of policy and finance, and in all other matters connected with the continuing activities of the Association. If such a Board be established it will take over the functions now suggested for the Committee on Policy and Finance, and certain other functions now performed by the Board of Directors of the Association. Pending the creation of such an Administrative Board, we recommend that the Committee on Policy and Finance exercise the following functions, in so far as they may be delegated to it without constitutional amendment:

a. To report to and advise the Board of Directors on matters of policy relating to finance, membership, publications, and the organization and administration of the Association.
b. In co-operation with the Board of Directors to seek the funds required for the research program outlined above, and for the effective administration of other Association activities.
c. To administer the funds entrusted to the Association for purposes of administration and research.
d. To co-operate with the standing Committee on Research in the promotion and financing of statistical research.

Since the functions of the Committee on Finance, now provided for in the By-Laws, will be taken over by the Committee on Policy and Finance, we recommend that number three of the By-Laws of the Association be suitably amended.

5. *Publications.* The publication policies and activities of the Association are closely linked to research policy and research activities; success in the latter field is dependent upon the existence of appropriate media of publication. The creation of a monograph series will broaden and to some extent complicate the Association's publication problem. We recommend that the Committee on Policy and Finance undertake a general review of the Association's publication activities and problems, in order that a consistent policy may be evolved, that the activities of the Association in this field may be properly co-ordinated, and that appropriate standards may be maintained. As an immediate means of strengthening the Association's publications we recommend that additional funds to the amount of $4,000 a year be provided the *Annals of Mathematical Statistics,* if such funds can be secured. We recommend, furthermore, the appointment of an editorial board to assist in the editing of the *Annals of Mathematical Statistics.* Under existing conditions this board would, presumably, be independent of the board which now co-operates with the editor of the *Journal.* We suggest that in any general review of the publication problems of the Association attention be given to the possibility of creating a single editorial board to assist in the editing of both publications.

6. *Financial requirements.* The prosecution of the research activities outlined above and the efficient performance of the Association's present functions require funds in addition to the present income of the Association. The officers of the Association and the Committee on Policy and Finance should be charged with the duty of seeking these funds. We estimate that the sum of $16,000 a year is required adequately to support the research program outlined, to finance the publications of the Association, and to enable the committees of the Association to function efficiently. These needs, in detail, are as follows:

Committee on Research	$7,500 a year
General committee expenses	2,000 a year
Annals of Mathematical Statistics	4,000 a year
Publication of monographs	2,500 a year
Total	$16,000 a year

The Committee on Research will require a continuing budget if it is to operate effectively. Of the sum suggested above for this committee, it is estimated that approximately $1,000 will be required by the central committee to cover traveling expenses, the expenses of meetings, etc., that approximately $4,000 will be required by the Committee on Statistical Theory and Methods (of which some $3,000 will be utilized in the preparation of monographs), and that approximately $2,500 will be required by field committees concerned with the improvement of statistical data. An additional sum of $2,000 a year is proposed for the use of the Board of Directors, the Committee on Policy and Finance and other committees of the Association. These items should be flexible, subject to modification by the Committee on Policy and Finance according to the needs of the various groups concerned.

The budgetary provisions outlined above are essential elements of our proposals. The funds proposed for the use of committees and for use in the preparation of monographs are intended to cover traveling and meeting expenses, stenographic and incidental minor expenses. Personal compensation of committee members is not contemplated.

The strength of the American Statistical Association lies in its membership. It is possible, through the program we have outlined, to tap the research potentialities of this membership and to take advantage of the wide variety of technical knowledge available among this membership. The provision of funds for covering the actual expenses of collaboration and joint activity in committee work is essential to the carrying out of this program. We believe that funds to further research may be spent most effectively in facilitating this type of co-operation among competent scientific workers.

7. We have recommended in this report the creation of agencies concerned with research on the one hand, and with problems of administration and finance on the other. Through the proposed Committee on Research and its subordinate committees, the American Statistical Association may discharge its prime responsibilities to the scientific world, responsibilities for the refinement of statistical techniques, for the dissemination of information concerning improvements in these techniques, and for the authentication and improvement of the basic data upon which research in the statistical sciences must rest. The Committee on Policy and Finance we believe to be a necessary addition to the administrative

machinery of the Association, providing at once an agency for the continuing review of Association problems and an instrument which shall ensure continuity of policy and of administration in financial matters. Such continuity is essential if financial grants for Association purposes are to be sought or accepted.

*W. A. BERRIDGE
H. C. CARVER
L. I. DUBLIN
†C. E. PARRY
W. A. SHEWHART
E. B. WILSON
F. C. MILLS

*Mr. Berridge subscribes to the report of the committee, with the following reservation:

"I fully concur with the Committee Report except in one particular. While the mathematical theory of statistical analysis seems to me highly important, and should certainly be emphasized as one of the important interests and activities of the proposed Committee on Research, I would much prefer not to see the function set apart under a separate committee or sub-committee. Instead, I believe that the Committee on Research should be allowed to hold open all matters of organization concerning it. I favor this not only as a matter of general administrative principle but also because such segregation of analytical method from considerations of the data analyzed seems undesirable on purely scientific grounds.

What the world needs is not only more statistics but better statistics. For that reason, is it not better to emphasize technique in its broader sense—not in the sense of mathematical analysis, as conceived in the Committee's Report, but in the sense of technique of planning, technique of questionnaire drafting, technique of sampling in the field and elsewhere, technique of tabulation, computation, etc., as well as the technique of mathematical analysis? Grievous mistakes in these other forms of technique are made just as commonly as in the special field of mathematical analysis. Even the very topics which we have suggested on page 2 do, in nearly all cases, intrinsically concern the data—and questions of method (in its broader sense) used in arriving at them—quite as much as they concern pure analysis.

In my judgment, the proposed Committee on Research should be urged to emphasize in all its activities, and in its selection of personnel, questions of methodology in all senses of the term; and in each substantive activity which it undertakes should compose its sub-committees with due consideration to an admixture of "method men" with "data men" that will be most wise and suitable in each particular project concerned. Would not this flexible arrangement be a far better guarantee that statistics will in future be not only more voluminous but also more valid?"

†Mr. Parry subscribes to the report of the Committee, with the following reservation:

"Excepting the section entitled *Improvement of statistical theory and methods.* As to the more mathematical details of this I am not qualified

to judge, and in the elaborate form in which it now stands in this report it seems to me to place unjustified emphasis on the value of research in methodology, in the more abstract sense, as compared with those other and more realistic phases of statistical research that are touched upon more briefly under the heading *Improvement of statistical data.*"

SUPPLEMENTARY REPORT

To the Board of Directors of the American Statistical Association:

The committee appointed at the request of the Social Science Research Council to advise on a program of research in statistics and to consider the function of the American Statistical Association in the prosecution of such a program is submitting its recommendations in an accompanying document. In the course of its deliberations it became clear to the committee, and to a representative group of the members of the Association who were called on to confer with the committee, that satisfactory provision for the furtherance of research and for the efficient administration of related activities would require certain modifications in the organization of the American Statistical Association. Our conclusions are summed up in the following recommendations:

1. We recommend that provision be made through an amendment to the constitution of the American Statistical Association for an Administrative Board, with membership as suggested below.
2. We recommend that the Administrative Board constitute the central governing body of the American Statistical Association in all matters connected with the continuing activities of the Association. More specifically, this Board should assume all the functions to be exercised by the proposed Committee on Policy and Finance and should, in addition, be vested with authority now resting in the Board of Directors in matters relating to general administration, finance and publication.
3. We recommend that the Administrative Board be composed of six members of the Association and the President, serving ex-officio. We suggest that elected members serve for terms of not less than three years, and that provision be made for rotation of membership in such manner that continuity of administration may be effectively secured. Members of the Administrative Board should be nominated by the Board of Directors, and elected by the membership at large. (Alternative provision should be made, however, for nomination by petition by twelve or more members of the Association.) We believe that no member should be re-elected until at least one year had elapsed after the expiration of a term in office.

Creation of an Administrative Board with the duties suggested would involve some change in the status of the Board of Directors. This Board, with its present composition, should continue to represent the various interests of the membership at large. Its chief functions would be the preparation of the annual program and the nomination of members of the Administrative Board. The Board of Directors would cease to be the central governing body of the Association, a change which seems to us essential because of the lack of continuity in the administrative policy of a body so constituted.

These recommendations, if accepted by the Board of Directors, will require amendment of the Constitution and By-Laws of the American Statistical Asso-

ciation. We do not here define in detail the changes which should be made. We have attempted merely to indicate the type of organization which we consider essential to the efficient performance of the functions outlined in our report on research and on related problems of policy and finance.

W. A. Berridge
H. C. Carver
L. I. Dublin
C. E. Parry
W. A. Shewhart
E. B. Wilson
F. C. Mills

REPORT OF REPRESENTATIVES ON THE SOCIAL SCIENCE RESEARCH COUNCIL

During the year the Council's program has progressed steadily along the lines chosen under its planning policy in 1929 and 1930. The development of research in certain specified fields of concentration has included the semi-autonomous set-up of the new Committee on International Relations under Dr. James T. Shotwell and the Committee on Industry and Trade under Dr. Givens. Dr. Shotwell spent the summer in Europe making preparations for the work in International Relations, partly in Geneva with the League's Committee on Intellectual Coöperation and partly in Central Europe. The work in Industry and Trade has gone forward under Dr. Givens' leadership through various subcommittees—those on Unemployment, Economic Statistics and Public Utilities, and Savings and Capital Formation have thus far been appointed—and through conferences. One of the important questions recently initiated by the committee is that of the feasibility of a national planning body.

Of the other fields chosen for special concentration, committees have been appointed on Consumption and Leisure, Personality and Culture, and Pressure Groups and Propaganda. The possibility of an exploratory committee also for the field of Metropolitan Living is under advisement.

Following the Council's resolution of Hanover 1930 affirming its interest in the promotion of research over the entire field of the social sciences, the constituent societies have been requested to review and consider carefully their research interests in relation to those of the Council, with the aim of obtaining their advice and coöperation in the Council's research plans and interests. Several such committees are active, and it is expected that a report on this subject will be made during the year. Continuing interest in research in the social sciences in colleges has resulted in a planning conference of representatives from a number of Eastern colleges which was held in New York in December. The three series of Council fellowships have continued during the year, 25 fellowships being awarded in the Research Fellowship program, 20 in the Agricultural Fellowships, and 20 in the Southern Fellowships. Thirty-five grants-in-aid awards have been made for the needs of more advanced scholars in the completion of pieces of research.

From the work of the many active committees may be noted the Survey of Activities of American Agencies in the Improvement of Materials for Research

in the Social Sciences and the Humanities; two new sub-committees of the Committee on Public Administration; expansion of the Committee on Social and Economic Research in Agriculture to include representation of forestry economics; Agricultural Land Utilization and Research in Agricultural Credit; the reorganized Committee on Social Statistics with Stuart A. Rice as secretary and part-time member of the Council staff.

A special committee on population, with Edgar Sydenstricker as Chairman, reviewed the work of the council in the field of population problems and made a report to the Council on which action is still pending.

Conferences have been held at various times during the year, including conferences on Rural Family Research, Problems and Techniques of Individualization in the Treatment of Offenders, developing out of a request from the American Bar Association, on Economic research, international research, personality and culture, unemployment, public utilities, price statistics, etc.

During the year Professor Arthur M. Schlesinger was re-elected chairman of the Council, with Professor W. F. Ogburn continuing as Vice-Chairman, Dr. R. H. Coats, Dominion Statistician for Canada was elected Secretary, with Dr. Isaiah Bowman, Treasurer. On February 1st Professor R. S. Woodworth of Columbia University succeeded Professor Edwin B. Wilson as President of the Council, and on September 1st Professor Robert T. Crane succeeded Mr. R. S. Lynd as Permanent Secretary.

The annual report of the Council for 1930-31 is now available and describes in some detail progress in the various sectors of the Council's work.

EDGAR SYDENSTRICKER, *Chairman*

PROGRESS REPORT ON THE WORK OF THE NATIONAL CONFERENCE ON NOMENCLATURE OF DISEASE

The National Conference on Nomenclature of Disease is the direct outgrowth of an informal conference held in New York on March 22, 1928, upon the invitation of the New York Academy of Medicine. It was recognized that important national societies representing medicine, surgery and their specialties, the Federal medical services and interested national health organizations and life insurance interests, should be brought together in an effort to develop a standard nomenclature of disease. The need for such a nomenclature has been recognized for a long time in view of the fact that medical nomenclatures in use throughout the country vary greatly in form. As a result thousands of hospitals, health organizations and insurance companies have felt obliged to devise their own nomenclature or, using an existing one, have proceeded to modify it beyond recognition.

The informal conference of March, 1928, was attended by representatives of the American College of Surgeons, the American Heart Association, the American Hospital Association, the American Medical Association, the American Public Health Association, the American Statistical Association, the American Surgical Association, the Association of American Physicians, several of the larger New York hospitals and the following Federal services: The Bureau of the Census,

the United States Public Health Service, the Medical Department of the Army and the Medical Department of the Navy. The other organizations which have since become identified with the Conference, and which, with the above, make up its membership, are as follows: The American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, the American Dermatological Association, the American Gastro-enterological Association, the American Gynecological Society, the American Laryngological Association, the American Neurological Association, the American Opthalmological Society, the American Orthopaedic Association, the American Otological Society, Inc., the American Pediatric Society, the American Psychiatric Association, the American Society for Clinical Investigation, the American Society of Tropical Medicine, the American Urological Association, and the United States Veterans Bureau. Individual members of the Conference are: Dr. Dana W. Atchley, Dr. George Baehr, Dr. E. H. L. Corwin, Dr. Henry A. Christian, Dr. Rufus I. Cole and Dr. Joseph T. Wearn.

The American Statistical Association honored me by designating me as its representative on the Conference.

The National Conference on Nomenclature of Disease, as now organized, is under the presidency of Dr. Haven Emerson. Dr. E. H. L. Corwin is Secretary. Two plenary meetings of the Conference have been held. In December, 1929, Dr. H. B. Logie was selected as Executive Secretary; he began his work February 1, 1930, and has been actively assisted by an Executive Committee, the personnel of which, at present, is as follows: Dr. George Baehr, Chairman, Dr. Dana W. Atchley, Dr. Henry A. Christian, Dr. E. H. L. Corwin, Dr. Haven Emerson, Dr. John A. Hartwell, Dr. Adrian V. S. Lambert, Dr. T. F. Murphy, Dr. C. G. Parnall, Mr. George H. Van Buren, Dr. R. C. Williams and Dr. H. B. Logie, Executive Secretary. The Conference has benefited by the valuable counsel of Mr. M. L. Goldstein, of the Metropolitan Life Insurance Company, with respect to codification and tabulation technique.

I wish to take this opportunity of calling the attention of the American Statistical Association to the fundamental difference between a scientific nomenclature of disease (like the National Nomenclature) and a *working* list, or classification of diseases (like the International List of Causes of Sickness and Death). The latter is merely a classification for practical use in registration offices and is, in no way, a scientific nomenclature. In the very nature of things, the International List must, and does contain many unscientific expressions. These are included because physicians actually report them on death certificates and there must be some guide as to the title heading to which they should be allocated for purposes of mortality or morbidity statistics. In the National Nomenclature unscientific terms are excluded, and English terms in good usage are employed, whenever possible, in preference to Latin and Greek terms.

The National Nomenclature is a dual one whereby diseases are classified on both an anatomical and an etiological basis. There are eleven main anatomical divisions as follows:

0 Diseases of the body as a whole (including diseases of the psyche, and of the body generally); and those not affecting a particular system exclusively.
1 Diseases of the integumentary system (including the subcutaneous areolar tissue and breast).
2 Diseases of the musculo-skeletal system (bones, joints, bursae, ligaments, muscles, tendons, and fascia).

3 Diseases of the respiratory system.
4 Diseases of the cardio-vascular system.
5 Diseases of the hemic and lymphatic systems.
6 Diseases of the digestive system.
7 Diseases of the uro-genital system
8 Diseases of the endocrine system.
9 Diseases of the nervous system.
x Diseases of the organs of special sense.

There are also eleven etiological categories as follows:

0 Diseases* due to prenatal influences.
1 Diseases due to lower plant and animal parasites.
2 Diseases due to higher plant and animal parasites.
3 Diseases due to intoxication.
4 Diseases due to trauma or physical agents.
5.0 Diseases due to circulatory disturbances.
5.5 Diseases due to disturbances of innervation or of psychic control.
6 Diseases due to or consisting of static mechanical abnormality (obstruction; calculus; displacement and gross changes in form, etc., due to unknown cause).
7 Diseases due to disorders of metabolism, growth or nutrition.
8 New growths.
9. Diseases due to unknown or uncertain causes, the structural reaction (degenerative, infiltrative, inflammatory, proliferative, scleratic or reparative) to which is manifest; hereditary and familial diseases of this nature.
x Diseases due to unknown or uncertain causes, the functional reaction to which is alone manifest; hereditary and familial diseases of this nature.

The following will illustrate the disposition made of several terms according to the National Nomenclature.

The method allows the inclusion, for purposes of statistics, of *all* diseases of an organ. At present, certain diseases of the heart cannot be classified as heart disease at all because they fall in some other rubric. For example, let us take syphilis of the heart. The National Nomenclature does not exclude syphilis of the heart from either heart disease or syphilis, because its code number is the code for heart (410-) plus the code for syphilis (-147), the entire code being thus 410-147. It is thus classifiable and recordable with all heart disease by virtue of the 410-, and with all syphilis by virtue of the -147. In this way the method overcomes the present error of contrasting statistics on site of disease with statistics on cause of disease. The two are not comparable, because every disease has a site and a cause, even if the latter is unknown. It would be just as valid to make deaths in childhood, and deaths from motor accidents mutually exclusive rubrics.

In the same way tuberculosis of the lung is classifiable and recordable both with diseases of the lung and with tuberculosis. Its code (360-123) is made up of the code for lung, 360- plus the code for tuberculosis, -123. The code for lobar pneumonia (360-100) brings this disease of the lung into relationship with tuberculosis of the lung, by virtue of the common 360- (lung). The code for tuberculosis of bone (200-123) brings this form of tuberculosis into relationship

*In the sense of departure from the normal structure or function.

with tuberculosis of the lung, by virtue of the common -123 (tuberculosis). Tuberculosis of the lung becomes thus statistically, as well as clinically, a disease of the lung, and tuberculosis of bone a disease of bone as well as tuberculosis.

The symbol for influenzal broncho-pneumonia is 361-168. The *3* indicates that this expression belongs under main anatomical division No. 3 (diseases of the respiratory system). The *61* indicates that the seat of the disease is the lung affecting scattered areas. The *168* shows that it belongs in the etiological category No. 1 (diseases due to lower plant or animal parasites). It also shows, more specifically, that it belongs to a sub-division of that category, namely, diseases due to specific filterable virus. Still more specifically, it indicates that it was due to the virus of influenza. A reference number in the nomenclature indicates that broncho-pneumonia is allocated, in the International List of Causes of Death, under Title 11, sub-division *a*, that is, Influenza with Respiratory Complications Specified. References to International List allocations are also given in the cases cited in the two paragraphs immediately preceding—and, in fact, uniformly throughout the Nomenclature.

This corrective influence on statistics could be illustrated at many points. The advantage, of course, is not one-sided. If statistics are rendered in terms of modern medicine, not only will the confusion of overlapping rubrics be eliminated, but mass statistics will become available for clinicians in every field. Statistics on heart disease, for example, will not only include all heart disease, but will be analyzable to show the distribution and mortality curves of the various diseases of the heart, without which precision statistics on heart disease fall far short of ideal clinical significance.

The National Nomenclature contains two divisions: the Detailed and the Abridged. The latter will serve as a simpler form of classification in small hospitals and in private practice.

A number of leading specialists in the various branches of medicine have given freely of their time to assist in the preparation of the National Nomenclature. Nevertheless, the major share of the responsibility for completing the work and all the credit for devising the dual form (which differs fundamentally from that of any previous nomenclature) goes to the Executive Secretary of the National Conference, Dr. H. B. Logie.

The National Conference has now formally adopted the nomenclature; and many important hospitals will immediately begin to use it. Accordingly, I believe that for the very first time in the history of this country we shall soon have really comparable hospital statistics.

In the brief time allotted for the presentation of this report, and in view of the limited space available for publication, it is possible to present only a fragmentary summary of particulars with respect to the National Nomenclature. A number of the medical societies have already approved it, and it is hoped that, through its Executive Board, we may also have the formal approval of the American Statistical Association.

GEORGE H. VAN BUREN.

REPORT OF THE COMMITTEE ON GOVERNMENTAL LABOR STATISTICS

During the year 1931 the Committee devoted its attention to the completion of the study of public employment office statistics in Europe and America, some further research in wage statistics and a number of other tasks.

(1) *Study of Statistical Procedure of Public Employment Offices.* As forecast at the last annual meeting, the report on public employment office statistics has occupied the major part of the Committee's attention for the year. The manuscript, apart from a few details, is now completed and ready for printing. The American section was completed late in the summer and constitutes the largest national section. It represents the first careful survey of American procedure in this field, apart from the statistical chapter of the Russell Sage Foundation's study on *Public Employment Offices.*

The Executive Secretary presented an interim report at the annual convention of the International Association of Public Employment Services held in Cincinnati, September 22-24, and the International Association appointed a committee to cooperate with the Committee on Governmental Labor Statistics. It seemed advisable that the recommendations for procedure in the United States should be considered by a group of officials actually engaged in employment office work.

The joint group thoroughly examined the procedure suggested for the United States and representatives of the public employment office experiments at Rochester and Philadelphia agreed to experiment with the suggested procedure. Those in charge of the employment office work of the Employment Stabilization Institute of the University of Minnesota have also indicated that they will cooperate in this way. It is expected that the study will be published by the Russell Sage Foundation as a companion volume to the Committee's book on *Employment Statistics for the United States*, edited by Hurlin and Berridge.

The study proposes central compilation of statistics of the offices by federal headquarters if a national employment service should be established—and failing that, by state headquarters. This compilation would be based on a daily record of the transactions in the offices, as contrasted with the present procedure, by which each office compiles its own statistical reports. Some such procedure was considered indispensable if uniformity and comparability of employment office statistics is to be achieved.

The plan also suggests that the figures compiled should show for each office the number of openings and applicants available on a given date, in addition to those on the volume of transactions of the offices during a given period, yielded by the present practice. This recommendation is in accord with procedure in the other countries studied, and with the recommendations of the international conference of labor statisticians called by the International Labor Organization.

(2) *Survey of Wage Statistics.* The subcommittee on wages, whose work is to set up a plan for governmental collection of statistics of wages comparable with the Committee's program for employment statistics, has completed a preliminary historical survey of the work of the federal and state governments and of the Dominion and provincial governments of Canada in the collection of wages data. The survey showed that, in the main, four procedures had been followed —questionnaire to employers, questionnaire to unions, collection by inspectors and information on workmen's compensation case records.

Discussion in the committee developed the thought that much of the material heretofore presented did not adequately describe actual wage conditions, that the union rates published by various authorities represented minimum standards and that frequently the wage rates actually in force were considerably higher. The committee recorded the view that average daily and weekly earnings, indicated in some wage investigations, had little significance in that they frequently covered workers in many different occupations. It was accepted as a principle for the future work of the committee that it should be directed toward the securing of actual wage rates earned on the job and to their presentation by standardized occupations.

The wages subcommittee has instituted some further research with an allowance set aside from the budget of the Committee on Governmental Labor Statistics. The purpose was to begin an analytical inventory of wage statistics with such technical description as seemed necessary. The Committee approved the undertaking and the hope was expressed that it might be carried further. Methods of financing it were discussed and the Chairman and the Executive Secretary were appointed a committee to seek the funds necessary to carry the project through to completion.

(3) *Presentation of the Committee's Program to the Joint Legislative Committee on Unemployment of the State of New York.* The Chairman of the Committee submitted a statement to the Joint Legislative Committee of the State of New York concerning improvement of the employment statistics of the state. Some time later several members of the committee took part in a conference with the State Temporary Emergency Relief Administration. At this meeting the Relief Administration was urged to use part of its funds to make a broad canvass of employment in the state to serve as a guide to it in the work of apportioning its moneys among the communities of the state and to provide a basis that the Department of Labor might use to construct a more representative employment index.

The following is a summary of the recommendations presented to the Joint Legislative Committee: (1) a general canvass, by mail, of all firms usually having 10 or more workers, in such important forms of employment as manufacturing, building construction, wholesale and retail trade, financial and banking institutions, transportation, public utilities and government employment (particularly on public works); (2) extension of the state's present monthly collection of statistics of manufacturing so as to provide for an adequate sample of firms and employes, not only for the state as a whole but for the larger cities and towns; (3) development of reporting in the construction industry, which has already begun in the State Department of Labor and needs to be amplified in order that publication of adequately representative figures may begin as promptly as possible; (4) extension of this reporting as rapidly as possible to other lines of activity, such as the following in the order named—retail and wholesale trade, governmental employment and employment in public works for the state, public utilities, hotels and restaurants, commercial banks and trust companies and savings institutions, brokerage and security houses, real estate offices, transportation (including taxicab, traction and trucking companies), and filling stations and garages.

(4) *Presentation of the Committee Program to the Committee on Manufactures of the United States Senate.* The Chairman presented the Committee's

program at a hearing of the Senate Committee on Manufactures, considering S. 6215, a bill to establish a National Economic Council. The statement outlined the Committee's program and the present situation in the collection of statistics of employment and earnings. It dealt with the census of unemployment, wages data, statistics of public employment offices and cost of living.

(5) *Proposed Expansion of Labor Statistics in Pennsylvania.* The Secretary of Labor and Industry of Pennsylvania has recently asked the Committee to assist in developing a plan for expansion of the statistical work of his Department. This task has been accepted and some preliminary steps taken.

(6) *Cooperation with the International Industrial Relations Association.* On behalf of the Committee, Dr. William A. Berridge took part in the preparation of reports on fluctuations in employment and unemployment in various countries, 1910-1930, which formed the factual basis for the discussion of social economic planning at the 1931 World Social Economic Congress held in Amsterdam, Holland, in August. The series, in which economists in different parts of the world collaborated, included Great Britain, France, Australia, Russia, Germany and the United States and Canada, Dr. Berridge preparing the last two. A corresponding report on China was necessarily informational rather than statistical. The point of interest for the Committee on Governmental Labor Statistics is that despite the differences in the methods of keeping statistics on employment and unemployment in these different countries, it was possible to compare the available information on two points: (1) the times of maximum and minimum employment and (2) the intensity of the change from the high point to the low point of depression.

For measuring the extent of unemployment the data in such countries as Great Britain and Germany proved, of course, to be superior to ours, but the facts for Canada and the United States had the advantage of more or less precise classification by trades and industries, which is not possible when the source material is secured from the worker rather than the payrolls.

As used in the discussions at the Congress, the information on employment and unemployment was shown to be a significant measure of the trend of economic conditions in all of these countries, thus demonstrating the contention of the Committee that this information is important not only as a measure of trends in employment, but as an indication of fluctuations in economic activity in its most significant phases. It is hoped that these preliminary studies may result in further progress in the efforts to secure international comparability.

(7) *Developments in Labor Statistics.* The employment statistics of the Bureau of Labor Statistics have been expanded; in contrast with 11,000 establishments covered in July, 1928, representing some three million workers, there were included in October, 1931, establishments to the number of 55,200 with a little more than four and a half million employes.

With reference to the fields of employment set up in the Wagner amendment to the Department of Labor Act, beginning in January, tabulations will be published for the building industry for certain cities of 100,000 population and for all the states. Returns are being gathered in 30 cities from 6,243 firms with 73,756 employes, and in January, six more cities will be included.

Illinois is planning to enter the building construction and governmental employment fields. Monthly tabulation of "nominal man hours" is now being made.

This figure is easier to secure than actual man hours, and seems to show the trend in hours.

In Pennsylvania the most important development of the year has been a plan of coöperation with the Bureau of Labor Statistics, under which dual collection of payroll figures by the federal and state bureaus has been eliminated. The Bureau of Labor Statistics has agreed to accept the reports collected by the Federal Reserve Bank of Philadelphia in coöperation with the state bureau. In November collection began on employment and payroll data for the building industry in coöperation with the Bureau of Labor Statistics. A canvass of five cities with a population of 100,000 or more has been made and some 1,200 firms are being included—approximately 10 per cent of the firms in the industry. Collection of these figures will be extended to all cities having a population of 50,000 and it is planned to expand the work into other non-manufacturing groups.

Wisconsin is enlarging its labor market samples and is breaking them down into figures for 30 individual cities and counties and for economic areas. A regular tabulation of man hours is being made, covering approximately all classifications for 800 employers out of a total of 1,200. The same tabulations are made for the state and for the county of Milwaukee, the principal industrial center.

In Massachusetts practically all the principal fields of employment are now being covered to a greater or less extent, but fishing, mining and quarrying are not included. The sample on agriculture is being expanded and now the coverage is 3 per cent of the total number employed. The coverage of the statistics may be summarized as follows: manufacturing, 45 per cent of the total; public utilities, a 95 per cent sample; wholesale and retail trade, 16 per cent of the industry and about 21 per cent of total coverage on the basis of employes; building construction, 3 per cent of the grand total and 20 to 25 per cent of the total in the industry; highway construction, quite complete coverage; municipal employment, quite complete coverage, about 90 per cent, with the city of Boston included; office and miscellaneous groups, 10 per cent of total coverage for all lines of employment. Construction of a general state index for all lines of employment is under consideration.

In New York State the Department of Labor is now collecting construction returns from more than 550 firms representing 33,000 employes, with a weekly payroll of about one and a quarter million dollars. This represents probably 10 per cent of the total number of employes. Publication of the data will begin shortly.

(8) *Program of the Committee for 1932.* During the year 1932 the Committee plans to coöperate with the employment office demonstration centers and any interested state employment services in experimenting with the Committee's suggested plan of employment office statistics, in drafting a manual of statistical procedure for use in local offices, and in the preparation of standard forms. The work of the wages subcommittee will be pushed forward so far as the resources of the Committee will permit; the questions of employe hours and correction of employment indexes, considered at the annual meeting, will also receive attention.

The membership of the Committee during the year has been as follows:

Charles E. Baldwin, United States Bureau of Labor Statistics
Joseph A. Becker, United States Department of Agriculture
William A. Berridge, Metropolitan Life Insurance Company
Louis Bloch, California State Unemployment Commission

R. D. Cahn, Chicago Tribune
R. H. Coats, Dominion Bureau of Statistics, Canada
J. Frederic Dewhurst, United States Department of Commerce
Paul H. Douglas, University of Chicago
O. A. Fried, Wisconsin Industrial Commission
Meredith B. Givens, Social Science Research Council
Leonard W. Hatch, New York State Department of Labor
Ralph G. Hurlin, Russell Sage Foundation
Don D. Lescohier, University of Wisconsin
Leifur Magnusson, Washington Branch, International Labor Office
Howard B. Myers, Illinois Department of Labor
Eugene B. Patton, New York State Department of Labor
Roswell F. Phelps, Massachusetts Department of Labor and Industries
Casimir A. Sienkiewicz, Federal Reserve Bank of Philadelphia
Bryce M. Stewart, Industrial Relations Counselors, Inc.
F. G. Tryon, United States Bureau of Mines
Mary van Kleeck, Russell Sage Foundation
H. H. Ward, Deputy Minister of Labor, Canada
Ralph J. Watkins, University of Pittsburgh

Respectfully submitted,
MARY VAN KLEECK, *Chairman*
BRYCE M. STEWART, *Executive Secretary*

REPORT OF COMMITTEE ON INSTITUTIONAL STATISTICS

To the American Statistical Association:

Regular meetings of the committee were held on May 26 and December 16, 1931, as well as several informal conferences throughout the year.

An event of major importance with respect to your committee's work was the creation in 1930 of the American Association of Public Welfare Officials and the establishment of its executive offices and staff at Washington early in the present year. From the beginning of the work of the Committee on Institutional Statistics, it was realized that its proposals for the betterment of public welfare statistics could not be satisfactorily carried out without the aid and coöperation of public welfare officials in government. The committee has, therefore, worked consistently and directly to bring into being a national organization of public welfare officials with which it might coöperate in defining statistical problems and outlining statistical procedures to be adopted by official welfare agencies generally. It would be too much to say that the Committee on Institutional Statistics is responsible for the creation of this new national agency, but it is fair to point out that the public welfare officials who have played a chief part in the creation of the American Association of Public Welfare Officials and in planning its work in the statistical field, drew their inspiration in large measure from their activities as members of the Committee on Institutional Statistics.

Coöperation between the Committee on Institutional Statistics and the American Association of Public Welfare Officials was guaranteed from the start. Frank Bane, commissioner of public welfare of Virginia, and Dr. Emil Frankel, director

of research and statistics of the New Jersey State Department of Institutions and Agencies, both of whom have long been active members of the Committee on Institutional Statistics, were appointed respectively as director and chairman of the committee on research and statistics of the Association of Public Welfare Officials, thus assuring that the projects of the Committee on Institutional Statistics would receive thorough consideration by representative public welfare officials of the country.

At the first regular meeting of the Committee on Institutional Statistics in May, 1921, a special subcommittee comprising Dr. Carl E. McCombs, chairman, Frederick W. Brown, and Miss Neva Deardorff was appointed to coöperate with the committee on research and statistics of the American Association of Public Welfare Officials in drafting a statistical research program to be carried on jointly by the two groups, and for which financial support might be obtained through one or more of the foundations interested in promoting public welfare services. After meeting, this joint committee has agreed upon the following program of work for the coming year, contingent upon securing the necessary financial aid.

1. Compilation and analysis of the laws of the various states bearing upon the collection of public welfare statistics.

2. Compilation of complete data on the existing systems of records and statistics in each of the special welfare fields, which seem best adapted to statistical purposes of that field.

3. Preparation of a handbook for public welfare officials containing a summary of the state laws, and a description of that particular system of records and statistics in each welfare field which is regarded as most satisfactory, together with such supplementary data and descriptive matter on state welfare services, and such references on statistical matters as may be desirable.

A special subcommittee on general hospital statistics comprising Dr. David M. Schneider, director of the bureau of research of the New York State Department of Social Welfare, and Dr. Emil Frankel, director of research and statistics of the New Jersey State Department of Institutions and Agencies, was appointed in May to coöperate with Dr. Charles F. Bolduan of the New York City Department of Health in the preparation of statistical schedules to be used by the New York State Department of Social Welfare in gathering information about the many public and private hospitals under its supervision, and as a demonstration of statistical procedure in the hospital field.

This subcommittee recommended to the committee that the New York State Department of Social Welfare be asked to inaugurate a monthly reporting system for the hospitals of New York State showing the movement of population in each institution in accordance with improved schedules prepared by the subcommittee. The action recommended has been taken by the committee.

In accordance with a suggestion of Dr. Charles F. Bolduan of the New York City Health Department, a hospital discharge certificate has been prepared by the subcommittee for use by general hospitals under the supervision of the New York State Department of Social Welfare for their discharged patients. The purpose of this certificate is primarily to provide more accurate statistical information on hospital morbidity and mortality. The subcommittee recommends that a representative group of hospitals of New York State, with an estimated total of 50,000 discharges yearly, be invited to participate voluntarily during 1932 in

preparing statistics of discharged patients, and that the New York State Department of Social Welfare through its bureau of research be asked to assemble and report upon this material. It is expected that this demonstration will be begun as soon after the first of the year as possible.

The Committee on Institutional Statistics has been invited to coöperate with the social statistics committee of the Social Science Research Council in its demonstration of comprehensive statewide collection and utilization of welfare statistics by the New York State Department of Welfare. This work will be carried on intensively during the coming year and it is anticipated that much of your committee's efforts will be devoted to this coöperative demonstration.

Early in 1931, the director of the census called several conferences in New York City of those interested in the improvement of the census bureau's reports on institutional statistics. These conferences were attended by representatives of your committee, several of whom have since served as members of advisory committees appointed by the director of the census to assist him in preparing statistical schedules and instructions, and otherwise aid him in assembling the data on institutional services. As the result of this work, greatly improved statistical information on these services for 1931 will be made available in the census reports. Further improvements will be made in the reports for 1932.

In all, your committee finds reason to be extremely gratified with the progress which has been made during the past year toward the general betterment of public welfare statistics, and we look forward confidently to even greater progress in 1932.

Respectfully submitted,
FRANK BANE
FREDERICK W. BROWN
KATE CLAGBORN
NEIL A. DAYTON
NEVA R. DEARDORFF
EMIL FRANKEL
C. LUTHER FRY
DAVID M. SCHNEIDER
CARL E. MCCOMBS, *Secretary*
HORATIO M. POLLOCK, *Chairman*

REPORT OF THE COMMITTEE ON CENSUS ENUMERATION AREAS

Your Committee has summarized the various methods in which census tract data is already being used, first in the field of social, economic, political and public health fields, and second, the practical uses, that is, those employed by commercial and industrial institutions.

Research

A. Social, economic, political and public health fields
   1. Discover population segregation by various items of composition, such as race, nativity, age, sex, etc.
   2. Provide a detailed population basis for social and economic studies, delinquency studies, studies on divorce and desertion, morbidity, mortality, and epidemiology

3. Flows of population, composition, etc.; changes of density, rates of increase and decrease and effect on rents, etc.
4. Basic data for local community studies, settlement house, neighborhood activities, churches, transportation, etc.
5. Economic and social statistics; the consideration of the economic area, distribution of various occupations, cultural trends, types of dwellings, status of homes, radios, etc.
6. Political studies, naturalization, literacy, voting behavior

B. Practical uses
1. Social welfare, location of social institutions, such as churches, schools, hospitals and hospital clinics, settlement houses, Y. M. C. A. and Y. W. C. A., parks, playgrounds and government buildings
2. Distribution of attendance
3. Analysis of service statistics, such as attendance and residence of clients
4. Forecasting of neighborhood changes
5. Commercial and industrial uses
   (a) Location of retail outlets by types
   (b) Distribution of purchasers
   (c) Study of marketing habits
   (d) Analysis of advertising media
   (e) Distribution of newspaper and magazine circulation
   (f) Trends in real estate valuation and development
   (g) Studies made by public utilities, telephone, electric light, gas, etc.
   (h) Location of industries desiring particular groups of workers
   (i) Distribution of employees with reference to their place of employment

The Committee believes that the maintenance of census tract cities and the extension of the census tract idea to additional cities depend upon the use those cities make of the data. We urge the collection of comparable data and feel that this Committee can be of service in this field. We recommend that a survey be made as to the basis upon which the census tracts have been developed in the various seventeen census tract cities.

We recommend that small units of population be maintained in order to make possible their combination in various ways. The Committee recommends that a whole day prior to the American Statistical Association meeting next year be devoted to a consideration of census tract data by representatives from each census tract city.

Respectfully submitted:
HOWARD W. GREEN, *Chairman*
ERNEST W. BURGESS
ROBERT E. CHADDOCK
GEORGE A. LUNDBERG (absent)
R. D. MCKENZIE
HARRY A. WEMBRIDGE

Informally it has been suggested that a meeting of one person from each census tract city be held in June for the purpose of promoting the use of census tracts and the exchange of ideas. This should be a two-day meeting and expenses of the delegates might well be paid by some interested organization.

REPORT OF THE REPRESENTATIVE ON THE JOINT COMMITTEE FOR THE DEVELOPMENT OF STATISTICAL APPLICATIONS IN ENGINEERING AND MANUFACTURING

Members of this Committee have been active in carrying out the program outlined in my report of last year. Partly as a result of such activities, applications in the field of industrial research have been extended to several important problems such as the specifications for good engineering and scientific data, the determination of criteria for detecting lack of statistical stability in experimental data, and the establishment of economic standards of quality so important in industrial stabilization and standardization. The program for 1932 calls for even greater activity along these lines.

Respectfully submitted,
W. A. SHEWHART, *Chairman*

REPORT OF THE COMMITTEE ON MONOGRAPHS

M. C. Rorty, as Chairman of Committee on Monographs reported that the only specific work done by the committee during the year had been a start made by Dr. Kopf toward the compilation of statistical definitions. This work, the committee, assumed, would be transferred to the new and enlarged committee that is to concern itself with such publications.

REPORT OF THE JOINT ADVISORY COMMITTEE ON THE CENSUS

A meeting of the Joint Advisory Committee of the American Statistical and American Economic Associations to the Director of the Census was held at the Bureau of the Census, March 13 and 14, 1931. The main subject of discussion was the wisdom of planning a new series of monographs, and at the end the Committee recommended a provisional list of five, two of which it is understood are now in course of preparation each by a member of the Committee.

During the period after the problems growing out of the census have for the most part been settled and before questions arising in connection with the intercensal work on other subjects come to the front, the Director of the Census has had little occasion to consult with the Advisory Committee.

WALTER F. WILLCOX, *Chairman*

REPORT OF THE COMMITTEE ON FELLOWS

After considerable correspondence with and voting among the members of the Committee on Fellows for the American Statistical Association we have agreed to nominate for Fellows the following men:

G. F. Warren
Ralph G. Hurlin
Mordecai Ezekiel

Notwithstanding the fact that in the past it has been customary to nominate two men, we find it difficult to agree upon a smaller number than the three names nominated. I hope our judgment in this matter is acceptable.

Sincerely yours,
HORACE SECRIST, *Chairman*

REPORT OF THE REAL ESTATE STATISTICS COMMITTEE

The Real Estate Statistics Committee has coöperated with the United States Department of Commerce and other organizations in the work of improving and standardizing vacancy surveys. The Chairman of the Committee is this Association's representative on a joint committee of the National Association of Real Estate Boards, Mortgage Bankers' Association of America, National Association of Building Owners and Managers, Associated General Contractors of America, and the American Statistical Association, which is working with the Post Office Department in an effort to work out a feasible plan for the enumeration of more effective data. A round table program (see program for afternoon of December 29) was arranged by the Committee for the purpose of discussing some of the major problems of real estate statistics. A report on current progress in making vacancy surveys was made at this round table and is included in the record of the proceedings of this meeting.

Respectfully submitted,
JOHN R. RIGGLEMAN, *Chairman*

REPORT OF REPRESENTATIVE ON THE ADVISORY BOARD OF THE AMERICAN YEAR BOOK

The Chairman, as usual, did not have very much work to do in connection with this Year Book. The publication appeared at the usual time early in the year and everyone seemed to think that the book was worth while.

Very truly yours,
EDWIN W. KOPF,
Representative, American Statistical Association to American Year Book

COMMITTEES FOR 1932

Committee on Nominations

William L. Crum, *Chairman* — Mary van Kleeck
Seymour L. Andrew

Committee on Policy and Finance

Malcolm C. Rorty, *Chairman* — Louis I. Dublin
Leonard P. Ayres — Edgar Sydenstricker
Robert E. Chaddock — Carl Snyder

Committee on Research

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